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November 24, 2008

Thomas S. Burack, Chairman
New Hampshire Site Evaluation Committee
29 Hazen Drive
P.O. Box 95
Concord, NH 03302-0095

**Re: Docket No. SEC 2008-02 - Application of Tennessee Gas Pipeline Company
For a Certificate of Site and Facility Concord Lateral Expansion Project**

Dear Chairman Burack:

We enclose for filing on behalf of Tennessee Gas Pipeline Company a copy of the noise report prepared by HFP Acoustical Consultants, Inc. dated November 6, 2008, together with attachments, which materials were provided to Public Counsel, the only other party in this proceeding, on November 7, 2008. The report's author, David Jones, PE, will be at the hearing on December 1, and available to testify with respect thereto.

If you have any questions, please have your staff call me.

Sincerely yours,

Donald J. Pfundstein

DJP/skr

Enclosure

cc: Service List



ACOUSTICAL CONSULTANTS INC.

November 6, 2008

Mr. Thomas Fillip
Principal Engineer
Tennessee Gas Pipeline Company
1001 Louisiana Street
Houston, TX 77002

Thomas.Fillip@elpaso.com
(713) 420-5780

Re: Final Computer Noise Model Review
Concord Expansion Project, Station 270B1
North Pelham, New Hampshire
HFP File No. 6514-1

Dear Mr. Fillip:

As per your request, HFP Acoustical Consultants Inc. ("HFP") has completed a final computer model review and noise control treatment review for the planned Compressor Station 270B1 ("Station").

1 Background

Tennessee Gas Pipeline Company ("TGP") is planning to build a new compressor station in Pelham, New Hampshire. Prior to HFP's involvement, a sound level assessment was performed for the Station by TetraTech Environmental ("TetraTech"). That assessment proposed a set of noise control treatments that would comply with the Federal Energy Regulatory Commission's ("FERC") sound level requirements for the site. Since that time, HFP has performed further computer modeling and treatment design to refine the computer model as additional manufacturer data has been received and as additional noise control treatment options have been requested by TGP.

2 Target

2.1 FERC

The Station is regulated by FERC. FERC's noise regulation is receptor based. It limits compressor station noise contributions to no more than 55 dB(A) day-night average (Ldn) or, equivalently, no more than a continuous 48.6 dB(A) at the surrounding noise sensitive areas ("NSAs").

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Phone: 713.789.9400

Houston, Texas 77036
Fax: 713.789.5493

#1140, 10201 Southport Road S.W.
Phone: 403.259.6600

Calgary, Alberta, Canada T2W 4X9
Fax: 403.259.6611

2.2 Other

There are no other known state, county, or local regulations that apply to the Station site.

The nearby Town of Windham has both a noise ordinance and a reference to noise in Section 714 of the Zoning Ordinance and Land Use Regulations. Neither of these are applicable to the Station and are evaluated here only as a reference. Both the noise ordinance and the zoning ordinance are attached.

The Windham noise ordinance does not include a numeric sound level target or requirement. Rather, in Section IV, the ordinance limits certain types of noise producing activities during the nighttime hours of each day if these activities create a noise disturbance that generates a complaint. None of the activities listed in the ordinance are relevant to the operation of continuous industrial noise sources such as the Station.

Section 714 of the zoning ordinance includes a limit on the qualitative aspects of noise: “All noise shall be muffled so as not to be objectionable due to intermittence, beat frequency or shrillness...” The zoning ordinance also includes a maximum allowable sound pressure level spectrum with sound level limits in eight octave bands.

The octave bands referenced in the zoning ordinance are outdated octave bands, and are not described by their center frequencies (as modern octave bands are), but rather by their low and high frequency boundaries. These octave bands were superseded by the modern octave bands in the early-1960s. Modern octave bands are defined by ANSI S1.11-2004 “Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters” and International Standard IEC 61260:1995 “Electroacoustics - Octave-Band and Fractional-Octave-Band Filters.”

There is a method to convert these old style octave bands into the modern octave bands. **Table 2-1** shows the original ordinance octave bands and the ordinance levels after conversion to modern octave bands. The overall logarithmic sum of the two ordinances is identical. That indicates that the same amount of sound energy is shown in the original and converted spectra.

The ordinance sound level targets apply at the property line of the subject property. **Table 2-1** shows the predicted sound level spectrum due to the Station at the east property line, which is the closest property line that adjoins the Town of Windham. The predicted sound level along the portions of property line that adjoin the Town of Windham is lower than the Windham zoning ordinance levels in each octave band.

3 Previous Work

TetraTech produced the original environmental sound level report for the project. It included sound level measurements of the existing levels and noise control treatment recommendations designed to meet the FERC requirements. The report was entitled “Baseline Sound Survey and Noise Impact Assessment” and was dated December 20, 2007. This report was marked as preliminary to indicate that it included preliminary data and assumptions.

HFP prepared a review, a computer sound model, a detailed noise control discussion, and a comparison with several regulations in a technical memorandum with the subject “Computer Noise Modeling,” dated June 9, 2008. That memorandum was intended to assist TGP engineers in choosing control treatments for all of the Station’s noise sources. It included three different sets of treatments, along with predicted sound levels for each of these cases.

The treatment recommendations in the June 9 report were updated to include the effect of the Solar data for the unsilenced turbine exhaust in early August. This resulted in a decrease in the required exhaust silencer performance because of a reduction in the manufacturer unsilenced sound power level of the exhaust. Revision 2 of the three treatment case tables were issued on August 6, 2008.

HFP prepared a computer model update on October 22, 2008. This report included a brief overview of the design state of the Station as of that date and a prediction of the Station sound level contribution at the surrounding NSAs. The report also included a second change to the exhaust sound power level. As documented in an e-mail from Bob Johnson of Solar, the exhaust sound power level that HFP had calculated in the August 6 Revision 2 was actually three decibels too high. This change was briefly discussed in the report. A more complete discussion of the exhaust sound power level is included in Section 4.2.3 of this report.

4 Station Sound Level Treatment Summary

A summary of the acoustical performance of each of the compressor station sound level treatments is shown in **Table 4-1**, attached. Each of these treatments is discussed in detail below. Where possible, actual manufacturer performance data has been included in the computer model and in **Table 4-1**. The datasheets or brochures used as the basis for the listed manufacturer data are attached to this report, and a comment noting the source of the data has been included in the table.

Shown in the bottom portion of **Table 4-1** are the original Revision 2 Case 3 noise control treatments as calculated August 6, 2008. In all cases, with the exception of the turbine exhaust

silencer¹, the manufacturer-supplied Transmission Loss (“TL”), Insertion Loss (“IL”) or Noise Reduction (“NR”) values are greater than (better than) the performance requirements outlined in the Case 3 treatments. Similarly, the sound power levels of the two supplied coolers are lower (quieter than) than Case 3 specified coolers in most octave bands and in the overall A-weighted sound power level. The performance of the turbine exhaust silencer can not be directly compared, because there was a change in the unsilenced exhaust sound power level. This change is discussed more fully in Section 4.2.3.

4.1 High-performance acoustical compressor building

4.1.1 Building Walls and Roof

The building walls and roof will be built using a 12 inch thick STC-52 insulated wall designated by the supplier as the 12N52 wall and roof system. A laboratory test report is attached that shows the transmission loss performance of this assembly. The 12N52 system consists of (listed from exterior to interior :)

- 24 gauge sheet metal exterior
- 6 inches of light-weight (nominal 0.6 to 0.8 pound per cubic foot R-19) fiberglass insulation
- 6 inches of high-density (nominal 8 pound per cubic foot) mineral wool insulation
- 26 gauge perforated metal liner panel

4.1.2 Building Ventilation Openings

The building wall and roof ventilation openings will include five foot long duct silencers, model 5HPA from Commercial Acoustics. The manufacturer stated performance of these silencers is shown in the attached manufacturer data sheet and in **Table 4-1**.

4.1.3 Equipment Door

A double roll-up equipment door will be included on the south wall of the building. The door opening will be nominally 14 feet by 16 feet. Two Overhead Door Corporation series 625 roll-up doors will be installed in the same opening: one on the outside of the building and one on the inside. The two doors will be separated by the wall thickness (or approximately twelve inches of airspace).

The inner and outer surface of each door slat is constructed of 24 gauge sheet metal and the slat cavity is filled with CFC-free foamed-in-place polyurethane insulation.

¹ As discussed in Section 4.2.3 the already ordered Case 2 exhaust silencer will result in similar or lower sound levels at the residences as compared to the August 6 Case 3 silencer due to a decrease in the given Solar unsilenced exhaust sound power.

A transmission loss test report for a single series 625 door is attached. Using this test, the sound transmission loss of two roll-up doors separated by a 12 inch air space has been estimated. The estimated performance is shown in **Table 4-1**. This estimated performance was used in the computer model.

4.2 Turbine exhaust silencer

4.2.1 Performance

A high-performance turbine exhaust silencer has been ordered for the project. The exhaust silencer DIL performance is shown in the attached email from Solar and is summarized in **Table 4-1**.

4.2.2 Exhaust Breakout

Solar has agreed to meet a sound pressure level target at a distance of 400 feet for the entire engine exhaust silencer system. This sound level target is an allowable sound limit for the entire exhaust system, which includes sound from the exhaust outlet opening and sound break-out from the exhaust duct casing. The total sound level system allowable contribution targets are shown in the attached Solar email, Table 6-1. The predicted sound levels from computer model are based on these exhaust system values.

4.2.3 Sound Power Level Discussion and Comparison

Since the preliminary TetraTech report was released, there have been some changes to the turbine exhaust sound level data. There are two important pieces of acoustical information associated with the turbine exhaust: the unsilenced turbine exhaust sound power level (how loud the turbine exhaust is without any acoustical treatments) and the dynamic insertion loss of the exhaust silencer (essentially how much reduction in sound there will be due to the silencer or “DIL”). Subtracting the DIL from the unsilenced exhaust sound power level yields the silenced exhaust sound power level. This silenced level is then used to calculate the exhaust sound level contribution at a distance.

The preliminary TetraTech unsilenced exhaust sound power levels were based on a total unsilenced sound power of 132 dB(A). Because Solar does not publish sound power levels, but rather sound pressure levels, HFP calculated the sound power levels included in the August 8 Revision 2 from Solar sound pressure level data. The total unsilenced sound power level of the exhaust was calculated to be 128 dB(A), or lower than the preliminary sound power level used in the TetraTech report. On August 11, 2008, Bob Johnson of Solar sent an email to HFP explaining that the sound power level of the exhaust could actually be 3 decibels lower, for a total sound power of 125 dB(A). The Revision 2 tables were not changed to take this reduction into account, leading to a 3 decibel reduction in the predicted sound level contribution of the

exhaust. Therefore, with this reduction in the exhaust sound power level, the already ordered current Case 2 silencer is anticipated to result in a silenced exhaust sound power level equal to or lower than the calculated August 6 Case 3 silenced exhaust sound power level.

Table 4-2 shows a comparison of the unsilenced exhaust sound power levels, specified DIL of the exhaust silencer, and the resulting silenced exhaust sound power level for three different computer models: the preliminary TetraTech model, the Revision 2 model, and the current computer model.

4.3 Turbine intake silencer / filter

4.3.1 Performance

The turbine intake silencer / filter combined insertion loss performance is shown in the attached memo from Solar.

4.3.2 Intake Breakout

To control sound energy breakout from the intake silencer body, it will be installed with either:

- at least half of the turbine side half of the length of the silencer body inside the compressor building, or
- the turbine side expansion joint and some portion of the turbine side half of the silencer inside the building. The portion of the turbine side half of the silencer which remains outside the building will be treated with acoustical lagging as described in Section 4.2.2 or lagging with equivalent acoustical performance.

4.4 Suction piping

All above-ground compressor suction piping that is on the compressor side of the separator/filter will be acoustically treated using:

- acoustical pipe lagging that will meet the insertion loss performance numbers shown in **Table 4-1**, or that will meet some portion of that performance in combination with
- barriers on the east and north of the piping yard. The size and extent of the barriers will depend on the exact piping layout, which is still being finalized.

4.5 Discharge piping

All above-ground compressor discharge piping that is on the compressor side of the separator/filter will be acoustically treated using:

- acoustical pipe lagging that will meet the insertion loss performance numbers shown in **Table 4-1**, or that will meet some portion of that performance in combination with

- barriers on the east and north of the piping yard. The size and extent of the barriers will depend on the exact piping layout, which is still being finalized.

4.6 Low-noise gas aftercooler

4.6.1 Sound Power Level

The gas cooler is a single-fan design using a Moore Series 30 fan. The fan sound power level is shown in the attached Moore fan data sheet and in **Table 4-1**.

4.6.2 Variable Frequency Drive

The gas cooler incorporates a variable frequency drive (“VFD”). This is a system that varies the fan speed to match the required cooling. Reducing the fan speeds can significantly reduce the noise produced by the fan. Since the ambient temperature will be significantly lower during most night periods, the cooler should be able to operate at a lower speed and produce less sound during these quiet periods. However, the average reduction in speed cannot be predicted and no sound level reduction has been included in the computer model due to the variable frequency drive.

4.7 Low-noise turbine lube oil cooler

Solar will supply the low-noise version of their lube oil cooler. This cooler has a total sound power level of 90 dB(A). The sound power level spectrum of the cooler is shown in **Table 4-1**. This sound power level is calculated from the sound pressure level given in Table 15 on page 17 of the Solar noise data booklet, attached.

5 Computer Model

5.1 Sound Power Level / Sound Pressure Level Data

Table 5-1 includes the input data used in the computer model. This information, in combination with the noise control treatment performance data from **Table 4-1** and the geometric information about the layout of the Station and the surrounding terrain, was used to calculate the Station sound contribution at the nearby NSAs.

5.2 Results

The predicted compressor station sound level contributions at the nearest NSAs with the sound level treatments listed in Section 4 range from 46 to 48 dB(A) Ldn.

These predicted levels at the NSAs have increased somewhat from the October 22 report due to several factors including:

- inclusion of manufacturer performance data for the building ventilation,
- increase in the unsilenced turbine air intake sound power level to match Solar manufacturer data, and
- a reduction in the ground absorption coefficient in the area of the compressor station from 0.5 to 0.1 to represent planned paved and gravel surfaces.

The predicted sound levels are well below the current FERC sound level requirement of 55 dB(A) Ldn.

Thank you for the opportunity to be of service. Please call if you have any questions or comments.

Sincerely,

HFP ACOUSTICAL CONSULTANTS INC.

A handwritten signature in black ink, appearing to read "David M. Jones", followed by a long horizontal flourish.

David M. Jones, P.E.
Senior Project Engineer

Table 2-1: Town of Windham Zoning Ordinance Sound Level Limit Evaluation

Old Style Octave Frequency Range, Hz	0 to 74	75 to 149	150 to 299	300 to 599	600 to 1199	1200 to 2399	2400 to 4799	4800 and up	
Windham Zoning Ordinance Sound Levels	74	59	52	46	42	39	36	33	
Modern Octave Center Frequencies, Hz	31.5	63	125	250	500	1000	2000	4000	8000
Converted Windham Ordinance Sound Levels	68	73	58	51	45	41	38	35	32
Predicted Station Contribution at Nearest Property Line with the Town of Windham	65	62	52	44	39	36	33	29	18

Table 4-1: Manufacturer Sound Level Treatment Data Compared to Case 3, Revision 2

Table 1. A Manufacturer Sound Level Treatment Data Compared to Case 3, Revision 2											
Component	Type	TL, NR, or IL									Source
		32	63	125	250	500	1k	2k	4k	8k	
Building Wall and Roof Perf.	TL	10	20	25	40	53	55	62	60	62	USSI 12N52 wall system, see attached data sheet*
Building Vent Intake Silencer	IL	6	12	20	23	42	48	45	38	21	Commercial Acoustics 5HPA Silencer, see attached data sheet*
Building Vent Exhaust Silencer	IL	4	9	17	25	39	46	45	40	25	
Building Roll-up Door	TL	3	10	17	24	25	27	31	42	49	Estimated based on a single door test.
Turbine Exh Silencer	IL	5	10	20	27	39	37	32	20	13	Solar custom exhaust silencer, see attached email from Solar.
Turbine Intake Silencer/Filter	IL	3	6	11	13	30	58	73	74	64	Sum of Solar Pulse Updraft Filter and Taurus 60 Intake Silencer, See attached Solar data.
Suct. Pipe Lagging/Blanket Treatment	NR	0	0	1	2	8	16	18	20	20	Required noise reduction using either acoustical lagging / blankets / barriers / or a combination.
Disch. Pipe Lagging/Blanket Treatment	NR	0	0	1	6	16	24	38	30	20	
Manufacturer Sound Power Levels	dBA	32	63	125	250	500	1k	2k	4k	8k	
Gas Aftercooler	89	96	96	95	92	87	85	79	73	67	Single fan gas aftercooler, see attached Moore fan data sheet*
Lube Oil Cooler	91	95	102	99	92	87	84	80	76	71	Solar 90 dBA special lube oil cooler.

* 31.5 Hz octave band performance estimated from 63 Hz octave band.

Case 3: Six dB Reduction Noise Control Treatments from August 6, 2008

Case 3: Sound Reduction Noise Control Treatments from August 3, 2008											
		TL, NR, or IL									
	Type	32	63	125	250	500	1k	2k	4k	8k	Source
Building Wall and Roof Perf.	TL	6	8	12	25	31	37	46	42	35	Case 3, Revision 2, August, 2008
Building Vent Intake/Exh Silencer	IL	2	6	12	16	22	28	30	28	16	
Building Roll-up Door	TL	2	7	12	18	20	23	30	38	41	
Turbine Exh Silencer	IL	7	14	20	27	41	38	32	22	13	
Turbine Intake Silencer/Filter	IL	2	4	5	9	18	43	52	51	40	
Suct. Pipe Lagging/Blanket Treatment	NR	0	0	1	2	8	16	18	20	20	
Disch. Pipe Lagging/Blanket Treatment	NR	0	0	1	6	16	24	38	30	20	
Specified Sound Power Levels	dBA	32	63	125	250	500	1k	2k	4k	8k	
Gas Aftercooler	91	107	107	98	91	83	80	79	85	83	
Lube Oil Cooler	94	103	101	98	95	90	85	84	88	83	

Table 4-2: Exhaust Sound Power Level Comparison

Description	Linear Sound Power (PWL) or Dynamic Insertion Loss (DIL) at Octave Center Frequency									dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
TetraTech Report, December 20, 2007										
Unsilenced Exhaust PWL	127	128	127	127	131	128	122	113	101	132
Exhaust Silencer DIL	8	13	20	31	37	37	35	25	15	
Silenced Exhaust PWL	119	115	107	96	94	91	87	88	86	98
Revision 2, August 6, 2008										
Unsilenced Exhaust PWL	121	123	123	122	129	123	117	105	96	128
Exhaust Silencer DIL	5	10	20	27	39	37	32	20	13	
Silenced Exhaust PWL	116	113	103	95	90	86	85	85	83	95
Current Computer Model, November 5, 2008										
Unsilenced Exhaust PWL	118	120	120	119	126	120	114	102	93	125
Exhaust Silencer DIL	5	10	20	27	39	37	32	20	13	
Silenced Exhaust PWL	113	110	100	92	87	83	82	82	80	92

November 6, 2008

Tennessee Gas Pipeline Company - Station 270B1

HFP File: 6495-1

Table 5-1: Computer Model Input Data, Sound Pressure (SPL) and Sound Power Levels (PWL)

Name										Sum	Data Source
	31.5	63	125	250	500	1000	2000	4000	8000	dB(A)	
Turbine Bldg, SPL inside	75	83	86	93	93	96	105	102	92	108	Measured at similar TGP station
Turbine Intake PWL, Unsilenced	107	113	119	120	121	123	126	150	142	151	Solar noise book, Page 13, Table 5, + 32 dB per Eq. 8 on Page 23
Turbine Exhaust PWL, Unsilenced	118	120	120	119	126	120	114	102	93	125	Solar noise book, Page 13, Table 6, + 32 dB per Eq. 8 on Page 23
LO Cooler PWL, Solar Special, 90 dBA	95	102	99	92	87	84	80	76	71	90	from Solar Book, Page 17, Table 15, +32 dB per Eq. 8 on Page 23
Gas Cooler PWL	96	96	95	92	87	85	79	73	67	90	Moore Fan Data Sheet, Ref 270B1, AC-100
Suction Piping PWL	76	71	77	79	92	100	101	96	88	105	Measured at similar TGP station
Discharge Piping PWL	81	71	84	100	104	107	119	112	102	121	Measured at similar TGP station



Architectural Testing

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

OVERHEAD DOOR CORPORATION
23 Industrial Road
Lewistown, Pennsylvania 17044

Report No: 01-37631.01

Test Sample Identification:

Series/Model: 625 Insulated Rolling Door

Type: Rolling Door

Option 1: Vinyl Weatherstrip on Interior Side of Jambs

Option 2: Vinyl Weatherstrip and Brush Weatherstrip on Interior Side of Jambs

Overall Size: 79.13" x 62.50"

Project Scope: Architectural Testing, Inc. (ATI) was contracted by Overhead Door Corporation to conduct a sound transmission loss test on a Series/Model 625 Insulated Rolling Door with two weatherstrip options. A summary of the results is listed in the Test Results section and the complete test data is included as Appendix B of this report.

Test Methods: The acoustical tests were conducted in accordance with the following:

ASTM E 90-97, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.*

ASTM E 413-87 (Re-approved 1999), *Classification for Rating Sound Insulation.*

ASTM E 1332-90 (Re-approved 1998), *Standard Classification for Determination of Outdoor-Indoor Transmission Class.*

Test Equipment: The equipment, used to conduct these tests, meets the requirements of ASTM E 90-97. The microphones were calibrated before conducting sound transmission loss tests. The test equipment and test chamber descriptions are listed in Appendix A.

130 Derry Court
York, PA 17402-9405
phone: 717.764.7700
fax: 717.764.4129
www.testati.com



Test Procedure:

Sound transmission loss tests were initially performed on a filler wall that was designed to test 3' 4" by 7' 0" and 6' 8" by 7' 0" specimens. The filler wall achieved an STC rating of 64.

A 2" x 10" wood frame was placed around the outside perimeter of the Series/Model 625, Insulated Rolling Door. A wall construction, consisting of 2" x 6" wood studs with 2 layers of 5/8" gypsum board on both sides and insulated with 6" fiberglass, was positioned on the source room side of the head assembly. Duct seal was used to seal the doorframe to the wood frame. The 6' 8" by 7' 0" plug was removed from the filler wall assembly and the test specimen was installed in the opening. The interior side of the door, when installed, was approximately 1/4" from being flush with the receiving room side of the filler wall. A dense neoprene gasket and duct seal was used to seal the wood frame to the inside perimeter of the filler wall opening. Drawings of the installation are located in Appendix D. The rolling door was opened and closed several times before testing. A stethoscope was used to check for any abnormal air leaks before the test.

One background noise sound pressure level, and five sound absorption measurements were conducted at each of the five microphone positions. Two sound pressure level measurements were made simultaneously in both rooms, at each of the five microphone positions. The air temperature and relative humidity conditions were monitored and recorded during the background, absorption, source and receive room measurements.

Sample Descriptions:

The 0.75" thick, operable curtain slats were constructed from 24 gauge, steel and were filled with a 2.0 lb. density, foamed-in-place, polyurethane foam. The jambs consisted of 3 steel angle brackets that were bolted together. The counterbalance assembly consisted of a 4" barrel with a 1" shaft. The counterbalance assembly was covered with an 18 gauge steel hood. The bottom bar of the door contained a single row of bulb weatherstrip. For Option 1, one row of vinyl weatherstrip was placed along on the interior side of the jambs. For Option 2, one row of vinyl weatherstrip and one row of brush weatherstrip was placed along on the interior side of the jambs.

Comments: The design drawings (included in Appendix C) supplied by the client, accurately describe the Series/Model 625 Insulated Rolling Door. The dimensions on the drawings that are circled and/or checked were verified against the test specimen. The test specimen was returned per the client's request. Photographs of the test specimen are included in Appendix E.



Test Results: The STC (Sound Transmission Class) rating was calculated in accordance with ASTM E 413-87. The OITC (Outdoor-Indoor Transmission Class) was calculated in accordance with ASTM E 1332-90. A summary of the sound transmission loss test results on the rolling door is listed below.

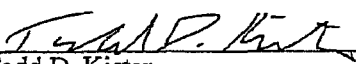
ATI Job File No.	Sample Description	STC	OITC
01-37631.01-1	Option 1: Series/Model 625, Insulated Rolling Door with vinyl weatherstrip on the interior side of the jambs.	21	18
01-37631.01-1a	Option 2: Series/Model 625, Insulated Rolling Door with vinyl weatherstrip and brush weatherstrip on the interior side of the jambs.	22	19

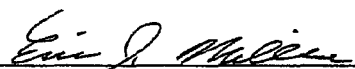
The complete test results are listed in Appendix B.

This report is prepared for the convenience of our customer and endeavors to provide accurate and timely project information. It contains a summary of observations made by a qualified representative of Architectural Testing, Inc. The results of this report apply only to the specimens that were tested. The statements made herein do not constitute approval, disapproval, certification or acceptance of performance or materials.

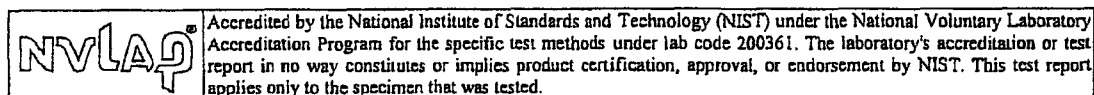
A copy of this report will be retained by ATI for a period of four years. This report is the exclusive property of the client so named herein. This report shall not be reproduced, except in full, without written approval by Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC:


Todd D. Kister
Technician


Eric J. Miller
Director - Acoustical Testing

TDK:tdk
01-37631.01





SECTION 08330
ROLLING DOORS
625 Series Stormtite™ Insulated Service Doors

PART 1 - GENERAL 1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including General and Supplementary Conditions, and Division 1 General Requirements, apply to the work of this Section

1.02 SUMMARY

- A. The work of this Section includes insulated rolling doors.
- B. Related Sections: Other specification sections which directly relate to the work of this Section include, but are not limited to, the following:
 - 1. Section 08710 - Finish Hardware; key cylinders for locks.
 - 2. Section 16100 - Electrical; wiring.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each type of rolling door. Include both published data and any specific data prepared for this project.
- B. Shop Drawings: Submit shop drawing for approval prior to fabrication. Include detailed plans, elevations, details of framing members, required clearances, anchors, and accessories. Include relationship with adjacent materials.

1.04. QUALITY ASSURANCE

- A. Manufacturer: Rolling doors shall be manufactured by a firm with a minimum of five years experience in the fabrication and installation of rolling doors. Manufacturers proposed for use, which are not named in these specifications, shall submit evidence





of ability to meet performance and fabrication requirements specified, and include a list of five projects of similar design and complexity completed within the past five years.

- B. Installer: Installation of rolling doors shall be performed by the authorized representative of the manufacturer.
 - C. Single-Source Responsibility: Provide doors, guides, motors, and related primary components from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.
 - D. Pre-Installation Conference: Schedule and convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
- 1.05 DELIVERY, STORAGE, AND HANDLING
- A. Deliver materials and products in labeled protective packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. Provide rolling doors by Overhead Door Corporation, Pennsylvania Division; Telephone 800-929-2553 or 717-248-0131; Fax 800-929-1274.

2.02 ROLLING DOORS

- A. Trade Reference: 625 Series Stormtite Insulated Service Doors by Overhead Door Corporation.





- B. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
1. Flat profile type F-2651 for doors up to 40'0" wide. The front slat shall be fabricated of 24 gauge galvanized steel. (22 gauge galvanized steel.) (20 gauge galvanized steel.) (18 gauge galvanized steel.) (22 gauge stainless steel.) (20 gauge stainless steel.) (Aluminum .040"). The back slat shall be 24 gauge galvanized steel. (24 gauge stainless steel.) (Aluminum .024").
 2. Slat cavity shall be filled with CFC-free foamed-in-place, polyurethane insulation.
- C. Finish:
1. Galvanized Steel: Slats and hood shall be galvanized steel in accordance with ASTM A 525 and receive rust-inhibitive, roll coating process, including bonderizing, 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester (powder coated) top coat. Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
 2. Stainless Steel: Slats and hood shall be stainless steel with (2B mill finish) (No. 4 satin finish).
 3. Aluminum: Slats and hood shall be aluminum with (mill finish) (clear anodized finish) (bronze anodized finish).
- D. Color: Gray polyester top coat. (Tan polyester top coat.) (Powder coating finish in color as selected by Architect from manufacturer's standard colors.)
- E. Windload Design: 20 PSF.
- F. Weatherseals: Vinyl bottom seal, exterior guide and internal hood seals. (Interior guide seals.) (Lintel seals.)
- G. Bottom Bar: Two prime painted steel (galvanized steel) (stainless steel) (aluminum) angles, minimum





thickness 1/8" bolted back to back to reinforce curtain in the guides.

- H. Guides: Three (galvanized) structural steel angles with minimum thickness of 3/16". Guides shall be weatherstripped with a vinyl weather seal at each jamb, on the exterior curtain side. (and interior curtain side.)
- I. Brackets: Hot rolled steel (Galvanized steel) (stainless steel) to support counterbalance, curtain and hood.
- J. Counterbalance: Helical torsion spring type designed for standard 20,000 cycle (50,000 cycle) (100,000 cycle) life design. Counterbalance shall be housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03" per foot of span. Counterbalance shall be adjustable by means of an adjusting tension wheel.
- K. Hood: Galvanized steel, 24 gauge (Stainless steel, 24 gauge) (Aluminum) hood with intermediate supports as required. Provide with internal hood baffleweatherseal.
- L. Manual Operation: Chain hoist (crank operation).
- M. Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
 - 1. Sensing Edge Protection: (Pneumatic sensing edge.) (Electric sensing edge.)
 - 2. Operator Controls: Push-button (Key) (Push-button and key) operated control stations with open, close, and stop buttons for surface (flush) mounting, for interior (exterior) (both interior and exterior) location.
 - 3. Special Operation: (Vehicle detector operation, radio control operation, card reader control, photocell operation, door timer operation,



commercial light package, explosion and dust ignition proof control wiring.)

- N. Locking: Interior bottom bar slide bolt lock for manually operated doors. Chain keeper locks for chain hoist operation. (Interior slide bolt lock for electric operation with interlock switch.) (Cylinder lock for electric operation with interlock switch.)
- O. Wall Mounting Condition: (Face-of-wall mounting.) (Between jambs mounting.)
- P. VisionLites: (3" x 5/8") uniformly spaced opening, open or with Plexiglas® covers.

PART 3 - EXECUTION 3.01 PREPARATION

- A. Take field dimension and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Strictly comply with manufacturer's installation instructions and recommendations. Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- B. Instruct Owner's personnel in proper operating procedures and maintenance schedule.

3.03 ADJUSTING AND CLEANING

- A. Test rolling doors for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Touch-up damaged coatings and finishes and repair minor damage. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned.



Subject: Re: EP-CON 3E331 Data Request

From: "Lorraine X. Heikkila" <HEIKKILA_LORRAINE_X@solarturbines.com>

Date: Fri, 31 Oct 2008 14:45:10 -0700

To: Dave Jones - HFP Acoustical <dave.jones@hfpacoustical.com>

CC: "Blake, Gregory V (Greg)" <Greg.Blake@ElPaso.com>, "Allen, Jay V" <Jay.Allen@ElPaso.com>, "Morgan, Michael T (Mike)" <Michael.Morgan@ElPaso.com>, "Fillip, Thomas M (Tom)" <Thomas.Fillip@ElPaso.com>, "Bruce A. Woodford" <Woodford_Bruce_A@solarturbines.com>

Dave -

Exhaust silencer insertion losses will be per Table 6-1, Revised Noise Report Aug. 6, 2008, Case 2.

Revision 2 August 6, 2008
Tennessee Gas Pipeline - Station 270B1

**Table 6-1: Exhaust System Insertion Loss (IL)
and Sound Pressure Level (SPL) Requirements**

Case	Type	Insertion Loss (IL) of Exh. System or Linear Sound Pressure Level Requirement at 400'									TOTAL dB(A)
		31.5	63	125	250	500	1000	2000	4000	8000	
Case 1	IL	3	8	14	22	34	32	26	20	13	
	SPL at 400'	69	65	54	43	42	39	34	32	20	46
Case 2	IL	5	10	20	27	39	37	32	20	13	
	SPL at 400'	67	63	48	38	37	34	28	32	20	42
Case 3	IL	7	14	20	27	41	38	32	22	13	
	SPL at 400'	65	59	48	38	35	33	28	30	20	40

Lube Oil Cooler, intake silencer and filter insertion losses will be per Solar noise data book

90 dBA cooler (special), Table 15, page 17

Filter is pulse cleaning updraft, Table 16, page 17

Inlet Silencer will be Centaur & Taurus 60 type, Table 17, page 17

Best Regards,

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10/29/2008 08:31 AM

To "Lorraine X. Heikkila"
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Subject Re: EP-CON 3E331 Data Request

PERFORMANCE



Solar Turbines
A Caterpillar Company

NOISE PREDICTION

Circle lines for information on this feature.

Introduction

This document provides information for predicting the noise levels from a site at a receiver a specified distance from the gas turbine installation. Site conditions, including piping, topography, equipment arrangement, reflective surfaces, meteorology, ground cover, and other noise sources, will affect the noise levels measured at the receiver. These conditions must be accounted for in the noise analysis of an installation. Because the consideration of these conditions requires expertise in the field of noise control engineering, detailed treatment of a site analysis is beyond the scope of this document.

This document uses atmospheric absorption, distance spreading, directivity, and noise source combination to demonstrate the procedure for performing a site noise analysis. Often, only these four factors are needed for the analysis. Since the other site conditions mentioned above are not considered in the procedure demonstrated herein, actual noise levels may exceed predicted levels.

Solar can provide a detailed noise analysis and report for use in environmental impact statements or for submittal to state or local authorities. To perform this analysis, site drawings, a description of the area, an equipment list, and the noise criteria, if specified, are needed.

Gas turbine specifications can have noise criteria that apply to the near field, far field, or both. These criteria must be considered separately because near-field noise data cannot be used to reliably predict far-field noise levels.

Unsilenced noise data for the *Saturn*®, *Centaur*®, *Mercury*™, *Taurus*™, *Mars*® and *Titan*™ gas turbines are found in Section 4, "Noise Data." This section also explains the procedure for selecting combustion air inlet silencers, exhaust silencers, and lube oil coolers.

Octave band sound pressure levels and A-weighted sound levels at 1 m (3 ft) from the base skid of the gas turbine and driven equipment are included for use in predicting workplace sound levels.

If the driven equipment is unenclosed and a gearbox is used, the gearbox must be enclosed. Gearboxes are significant noise sources that are often quoted at 85 dBA measured 1 m (3 ft) from the gearbox at no load conditions. When the gearbox is under load, however, the sound level 1 m (3 ft) from the gearbox can exceed 95 dBA.

ACOUSTICAL ENCLOSURE

Solar's acoustical enclosure is designed to maximize noise reduction. The A-weighted sound level of Solar's acoustically enclosed gas turbines (except for the *Saturn*) at full-load operation, when installed in a free field, is estimated to meet an average of 85 dBA at 1 m (3 ft) from the enclosure and at 1.5 m (5 ft) above the bottom of the skid. This sound level is measured at points spaced typically 1.5 to 3.0 m (5 to 10 ft) apart on each side of the enclosure and at one position on each end of the enclosure on the longitudinal axis. The enclosed *Saturn* gas turbine has a design A-weighted sound level of 90 dBA.

For enclosed *Mars* and *Titan* gas turbine packages, acoustical lagging is required for the combustion air inlet ducting. Solar can provide this lagging, which for the *Mars* gas turbine must extend from the top of the enclosure to the inlet air cleaner or for the *Titan* gas turbine must extend from the top of the enclosure through the flex duct.

Again, the estimated sound level is exclusive of other site conditions. Additionally, if there is a gap between the bottom of the skid and the housekeeping pad, deck or ground, this gap must be sealed with a non-hardening caulk.

When enclosed packages are installed on elevated mounts, such as gimbals or anti-vibration mounts, the gap between the skid bottom and the deck is typically about 305 to 355 mm (12 to 14 in.), which is too large to seal by caulking. Sound emission from the skid bottom will increase the sound level adjacent to the package. For example, and the average sound level from an 85 dBA package will be increased 3 to 4 dBA. For elevated installations, the 85 dBA average sound level can be obtained only through the use of skirts that extend from the bottom of the skid to the deck.

SPECIAL NOISE CONTROL COMPONENTS

When noise criteria cannot be met with the use of standard components, Solar can supply special oil coolers, combustion air inlet and exhaust silencers, and enclosures. Contact Solar's Mechanical Package Design department for information about the recommended material and installation for acoustical lagging, special noise control components, and other noise requirements.

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Conversion Chart

ABBREVIATIONS

abs	Absolute
ata	atmosphere absolute
Btu	British thermal unit
Btu/h	British thermal units/hour
cfm	cubic feet/minute
cm	centimeter
cm ²	square centimeter
cm ³	cubic centimeter
cu ft	cubic feet
°C	degrees Celsius
°F	degrees Fahrenheit
fps	feet per second
ft/s	feet/second
ft-lb	foot-pound
ft-lb/lb _m	foot-pound force/pound mass
gal.	gallon
hp	horsepower
in.	inch
in. Hg	inches of mercury
in. H ₂ O	inches of water
kcal	kilocalorie
kg	kilogram
kJ	kilojoule
kPa	kilopascal
ksi	1000 pounds/square inch
kW	kilowatt
L	liter
m	meter
mm	millimeter
MMSCFD	millions of standard* cubic feet/day
MPa	megapascal
mph	miles per hour
m ²	square meter
m ³	cubic meter
m ³ /min	cubic meters/minute
N	Newton
N/m ²	Pascal
nm ³ /h	normal** cubic meters/hour
psi	pounds/square inch
psia	pounds/square inch absolute
psig	pounds/square inch gauge
scf	standard* cubic foot
scfd	standard* cubic feet/day
scfm	standard* cubic feet/minute
sm ³ /h	standard*** cubic meters/hour
sq	square

* "standard" = 60°F, 14.7 psia
 ** "normal" = 0°C, 1.01325 x 10⁵ Pascals
 *** "standard" = 15°C, 760 mm Hg

CONVERSION FACTORS

To Convert from Old English	To S.I. Metric	Multiply by	To Old Metric	Multiply by
Btu	kJ	1.0551	kcal	0.252
Btu/h	W	0.2931	kcal/h	0.252
Btu/scf	kJ/nm ³	39.3694	kcal/nm ³	9.382
cfm	m ³ /min	0.028317	m ³ /min	0.028317
cfm	m ³ /s	0.00047195	m ³ /s	0.00047195
cu ft	m ³	0.028317	m ³	0.028317
°F	°C	(°F-32) 5/9	°C	(°F-32) 5/9
°F (Interval)	°C (Interval)	5/9	°C (Interval)	5/9
ft	m	0.3048	m	0.3048
ft-lb/lb _m	kJ/kg	0.0029891	kJ/kg	0.002989
ft/s	m/s	0.3048	m/s	0.3048
gal. (U.S.)	L	3.7854	L	3.7854
hp	kW	0.7457	kW	0.7457
in.	mm	25.400	cm	2.540
in. Hg	kPa	3.3769	cm Hg	2.540
in. H ₂ O	kPa	0.2488	cm H ₂ O	2.540
kcal	kJ	4.1868		
lb	kg	0.4536	kg	0.4536
lb/cu ft	kg/m ³	16.0185	kg/m ³	16.0185
lb/sq ft	kg/m ²	4.882428	kg/m ²	4.882428
lb _r	N	4.448222		
lb _r -in.	Nm	0.1129848		
MMSCFD	nm ³ /min	18.62	nm ³ /h	1117
mph	km/h	1.6093	km/h	1.6093
psi	kPa	6.8948	kg/cm ²	0.070
psia	kPa (a)	6.8948	bars abs	0.068948
psig	kPa (g)	6.8948	ata	0.070
scfm	nm ³ /min	0.0268	nm ³ /h	1.61
sq in.	mm ²	645.16	cm ²	6.4516
sq ft	m ²	0.0929	m ²	0.0929
yd	m	0.914	m	0.914
To Convert from Old Metric	To S.I. Metric	Multiply by		
atm	kPa	101.325		
bar	kPa	100.0		
cm	mm	10		
cm Hg	kPa	1.3332		
cm H ₂ O	kPa	0.09807		
kcal/h	W	1.16279		
kg/cm ²	kPa	98.0665		
nm ³ /h	nm ³ /min	0.0167		

1 Noise Criteria

1.1 COMMUNITY NOISE CRITERIA

Noise specifications, as they apply to gas turbine installations, are generally based on local, state, or federal criteria in the United States, and on local, county, or provincial criteria in other countries. In the United States, they are generally based on A-weighted sound levels or on day/night average sound levels (Ldn), although some ordinances include octave band sound pressure level criteria. Two common criteria are an A-weighted sound level of 45 dBA and an Ldn of 55 dBA (which is also an A-weighted criterion). However, other ordinances based on ambient sound levels and which state, in effect, that the ambient sound level cannot be increased, can be much more stringent. Ambient A-weighted sound levels in rural areas are often measured as low as 40 dBA and can be as low as 30 dBA. A summary of A-weighted daytime and nighttime sound levels in U.S. cities is given in Figure 1 (Beranek, 1988).

However, emergency equipment, such as standby electrical generator sets, are generally allowed to operate at higher noise levels, typically as much as 10 dBA above the maximum allowed for continuously operated noise sources.

1.2 FEDERAL ENERGY REGULATORY COMMISSION CRITERIA

The Federal Energy Regulatory Commission (FERC) currently requires that all new compressor stations under its jurisdiction meet an Ldn of 55 dBA at the nearest noise sensitive area. This criterion is applied to the new compressor station or to the additional gas turbine at an existing station.

If the gas turbine is being added to a station with existing horsepower, FERC may also request a field noise survey of the existing station. The noise survey will provide noise data that FERC will use to assess the impact of the additional horsepower on the existing noise levels. FERC may also examine its records on the existing station to determine if noise complaints have been lodged against the station by residents. If there have been complaints, FERC may require the applicant to conduct an assessment to determine the practicality of remedial noise treatment for the existing station.

If the gas turbine being installed is a replacement for existing horsepower, a noise analysis is not required if there is no net increase in station horsepower.

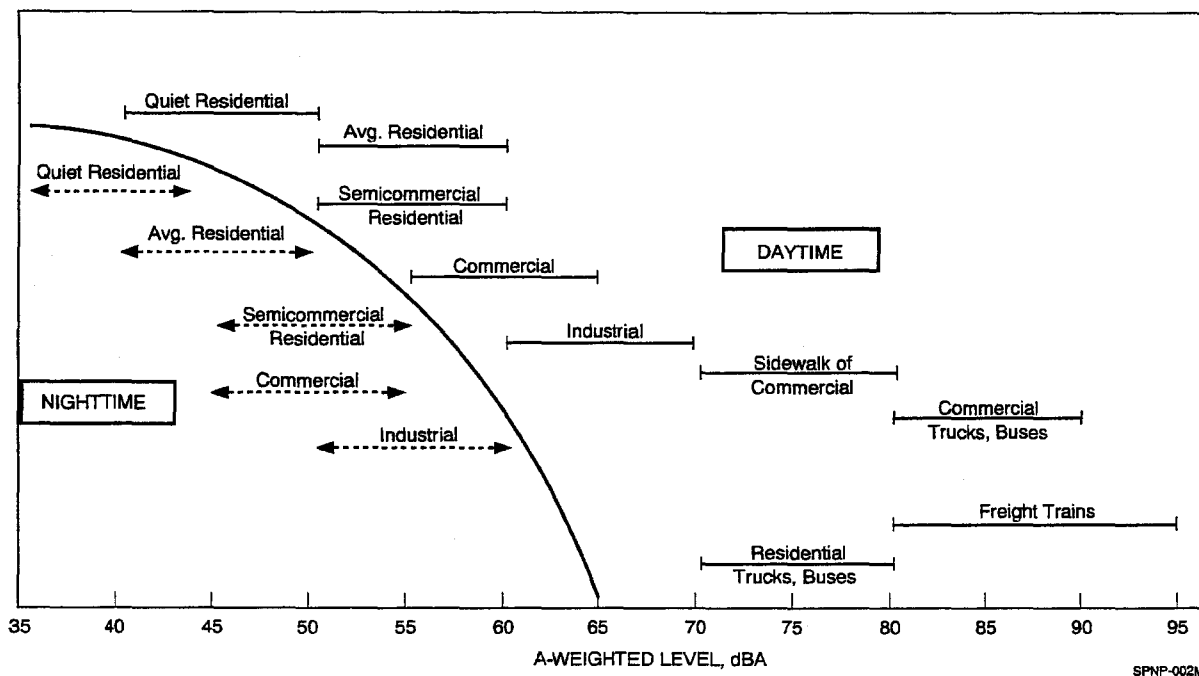


Figure 1. A-Weighted Day/Night Sound Levels in U.S. Cities

1.3 NEAR-FIELD CRITERIA

Near-field noise criteria are typically specified for a distance of 1 m (3 ft) from the noise source, for example, from the enclosure surface. 85 dBA is usually specified in the belief that an enclosure meeting this criterion will comply with the 8-hour personnel exposure action level of 85 dBA specified in most noise standards. Often, however, specifications for an estimated 85 dBA sound level at 1 m (3 ft) from the enclosure do not consider the room effect or the presence of other noise sources in the room, including other gas turbine packages. Therefore, the sound level in the gas turbine room could exceed 85 dBA, even if the enclosed package by itself meets an 85 dBA criterion at 1 m (3 ft) in a free field.

The employer has a clear advantage if the sound level in the gas turbine room is maintained below 85 dBA since no one working in the room will be exposed to an 8-hour exposure level above 85 dBA and the compliance measures required for exposure levels exceeding this value will not be triggered. However, the benefit of specifying an estimated 85 dBA sound level at 1 m (3 ft) from the enclosure may not be realized since:

- Specifications for 85 dBA at 1 m (3 ft) from the enclosure are often written in the belief that these are maximum exposures allowed by the standard.
- Sound level in the gas turbine room could be above 85 dBA even if the standard 85 dBA acoustical enclosure is used.
- Employees do not normally spend their entire 8-hour workday in the gas turbine room.

Enclosures meeting requirements for a sound level not exceeding 85 dBA at any measurement location 1 m (3 ft) from the enclosure and 1.5 m (5 ft) high are available, but these enclosures are more expensive than the standard enclosure since they require tighter construction and a skirt to cover the base rail. Tighter construction significantly reduces maintenance access to the gas turbine package. The skirt extends from the top of the skid to the ground.

For enclosures meeting 80 dBA and lower, an offskid enclosure is required. Offskid enclosures can be supplied as close fitting, meaning the clearance between the enclosure panels and the base rail is 51 or 76 mm (2 or 3 in.). Alternatively, the enclosure can be 1 m (3 ft) wider than the base rail in order to provide a walk-around space inside. The wider enclosure significantly increases the space occupied by the gas turbine package since it adds as much as 1.8 m (6 ft) to the length and width of the standard package.

1.4 NEAR-FIELD CRITERIA IN OUTDOOR INSTALLATIONS

When the gas turbine package will be installed outdoors, the selection of the inlet and exhaust silencers will not affect the near-field sound levels: at 1 m (3 ft) from the enclosure. This is because the noise limiting source is the enclosure. Improving the inlet and exhaust silencers beyond the insertion loss values of the lowest performing standard silencers will not decrease the average sound level from the gas turbine package.

2 Noise Sources

Noise sources typical of a gas turbine installation are the gas turbine combustion air inlet and exhaust, the gas turbine casing (including gas turbine and gearbox), and driven equipment. Other noise sources often include cooling towers, fuel gas compressor skids, fuel gas coolers, lube oil coolers, transformers, blow-down vents, and process piping.

If the gas turbine is installed in a building, casing and driven equipment noise becomes an aspect of noise transmitted through the building walls. Noise from building ventilation systems must also be considered.

All of these noise sources must be added and compared with the noise criteria. Noise control systems must be designed to prevent the site sound level from exceeding the criteria.

2.1 VIBRATION ISOLATION

Structure-borne vibrations from a gas turbine are generally at frequencies above building resonances. Exceptions exist for driven equipment having rotating or reciprocating frequencies below 60 Hz. Vibration isolation may be necessary to reduce the transmission of vibration from the driven equipment to the building structure. For example, a gas turbine driving an 1800-rpm electric generator will produce a 30-Hz driving force. Whether vibration isolation is required will depend upon where the gas turbine generator set is located within the building. Generally, vibration isolation is recommended for above-grade installation in buildings.

For vibration isolation, elastomeric pads are generally used, although springs can be used by those who prefer them. For installation on the upper or top floors of a building or on offshore platforms, the need for vibration isolation should be considered and rejected only if analysis demonstrates that vibration isolation is not necessary.

2.2 OCTAVE BAND PREFERRED FREQUENCIES AND FREQUENCY BANDS

Octave bands are used to describe the noise from noise sources. They are commonly used in specifications and ordinances to define maximally accepted noise levels. The frequency range employed is 22 Hz to 11,314 Hz in nine octave bands.

Table 1 describes these octave band center frequencies and the upper and lower cutoff frequencies for each octave band. The cutoff frequencies have been calculated from ANSI S1.11-1986 (R1998).

2.3 WEIGHTED SOUND LEVELS

A sound level meter equipped with a frequency weighting filter can give a single number reading from the selected weighting network. The three most common weighted networks are A, B, and C, although the A-weighting network is by far the most frequently used. The frequency response characteristics of each of these weighted networks are shown in Figure 2, which is produced from frequency weightings in ANSI S1.4-1983 (R1997).

The A, B, and C weighting networks approximate the response of the human ear's equal loudness perception of pure tones relative to a reference sound pressure level at 1000 Hz. The human ear is less sensitive to lower frequency sounds at lower sound levels, but as the sound levels increase, this sensitivity is less pronounced, which accounts for the development of the three weighting networks. However, because using a single number is an easy way to rate noise and because the A-weighting has a high correlation with other noise rating methods, it is the most widely accepted way to rate human response to noise. It is used internationally in noise standards and regulations.

Table 1. Frequencies and Frequency Bands

	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Frequency Range, Hz	22	45	89	177	354	707	1414	2828	5657
	to	to	to	to	to	to	to	to	to
	45	89	177	354	707	1414	2828	5657	11,314

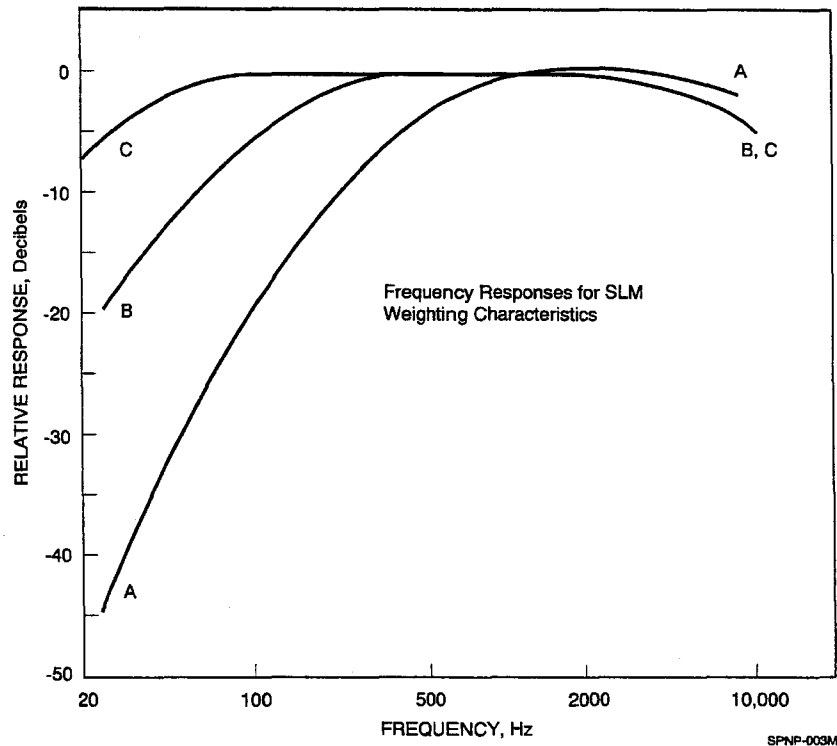


Figure 2. Sound Level Meter-Weighted Frequency Response Characteristics

A sound level meter having the A, B, and C weighting networks can be used to estimate the frequency distribution. If the sound level is relatively the same when measured on all three networks, the source noise is probably primarily above 600 Hz. If the C-weighted sound level is several dBA higher than the A and B networks, low frequency sound (below 600 Hz) predominates.

Typical A-weighted sound levels of various noise sources are shown in Figure 3 (Peterson, 1980).

2.4 COMMUNITY RESPONSE TO NOISE

Individuals respond differently to noise and the range of response can be quite large. Noise that is intrusive and annoying to some may not be bothersome to others. The response of an individual to noise depends on several factors, some of which are given below. These factors, taken from Peterson (1980) are also discussed in EPA (1974), Pollack (1952) and Schultz (1972).

1. The magnitude of the noise level and its spectral shape.

2. The variation of the noise level with time.
3. The time of day. People are more sensitive to nighttime than to daytime noise.
4. The time of year. During cold weather, doors and windows are shut, so homes are better insulated from external noise sources.
5. Previous exposure. People apparently are conditioned by their previous exposure to noise.
6. Pure tones. Noise with pure tone components are apparently more objectionable than noise without pure tone components.
7. Impulsive noise.
8. Community acceptance. Apparently, a community's tolerance of an intruding noise is increased if the community accepts the function of the noise producer as very necessary.
9. Socio-economic status.

There are numerous documents (guidelines, ordinances, and standards), dealing with community noise. Among the currently pertinent are the HUD Environmental Criteria and Standards, the Model Community Noise Control Ordinance, the EPA Noise Guidelines, and the ANSI S12.9-1998 Standard.

These documents are more applicable to city and residential areas than to rural areas.

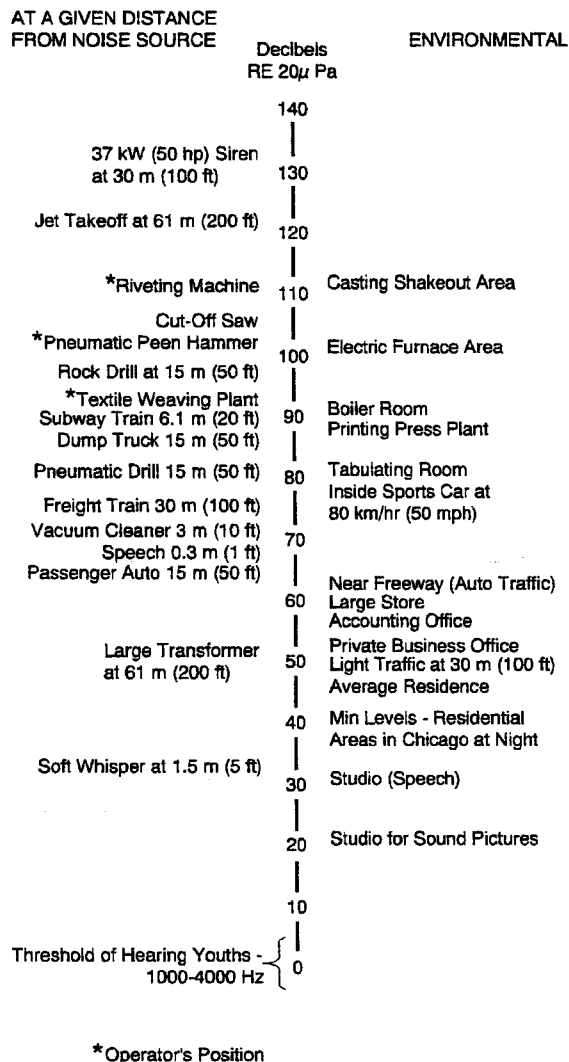


Figure 3. Typical A-Weighted Sound Levels of Representative Noise Sources

3 Physical Properties of Sound

The physical properties of sound discussed in this section will be limited to:

- Spreading of the sound wave with distance
- Temperature inversion
- Atmospheric absorption
- Directivity effects
- Combining sound levels

3.1 DISTANCE SPREADING

In the far field of a noise source, the sound level decreases in accordance with the "inverse square rule." The decrease in the sound level with distance is taken as 6 dBA for each doubling of the distance from the noise source. This can be calculated using Eq. 1:

Note: to use this equation, R_1 must be in the far field. Do not use this equation with 1 m (3 ft) data; use 15 m (50 ft) data.

Equation (1)

$$Lp_2 = Lp_1 - 20 \log_{10} [R_2 / R_1], \text{ dBA}$$

where:

Lp_2 = Sound level at the new location

Lp_1 = Sound level at the initial location

R_2 = Distance from the noise source to the new location

R_1 = Distance from the noise source to the initial location

3.2 TEMPERATURE INVERSION

A temperature inversion occurs when the temperature of the air increases, instead of decreasing, with elevation. During this condition, the sound wave suffers repeated reflections between the ground and the thermal layer, and the pressure of the sound wave does not decrease in proportion to the inverse of the distance squared, as it propagates in the far field.

Unfortunately, there are no procedures that can easily be used to predict the effects of a temperature inversion and wind effects usually predominate over thermal inversions (Electric Power Plant, 1983). For these two reasons and because inversions are considered upset conditions that

occur infrequently, designing for them does not justify the considerable additional expense.

3.3 ATMOSPHERIC ABSORPTION

The absorption of acoustic energy by the atmosphere decreases the sound level as the sound propagates from the noise source. This decrease in sound level caused by atmospheric absorption is added to the sound level decrease that occurs with distance. Figure 4 combines distance spreading and atmospheric absorption to show the decrease in sound level with increasing distance from a noise source. Eq. 1 now takes the form:

Note: to use this equation, R_1 must be in the far field. Do not use this equation with 1 m (3 ft) data; use 15 m (50 ft) data.

Equation (2)

$$Lp_2 = Lp_1 - 20 \log_{10} [R_2 / R_1] - \alpha [R_2 - R_1], \text{ dBA}$$

where:

α = Atmospheric absorption in dBA/unit distance calculated in accordance with ANSI Standard S1.26-1995 for 100% relative humidity and an ambient temperature of 20°C (68°F).

Lp_2 = Sound level at the new location

Lp_1 = Sound level at the initial location

R_2 = Distance from the noise source to the new location

R_1 = Distance from the noise source to the initial location

3.4 DIRECTIVITY EFFECTS

Directivity effects as discussed in this document are applied to stack openings. Sound from the outlet of an exhaust stack is greater in front of the stack opening than at the side. As shown in Figure 5, while a position in front of the stack opening is at zero degrees to the direction of flow, at the side, the position could be 45, 60, 90, or 135 degrees. The directivity effect is affected by both frequency and the area of the stack opening. The higher the frequency and the larger the stack opening, the greater the effect.

Because of variabilities in the results of measurements of stack directivity, Table 2 (AGA, 1969) is offered as an average of those effects.

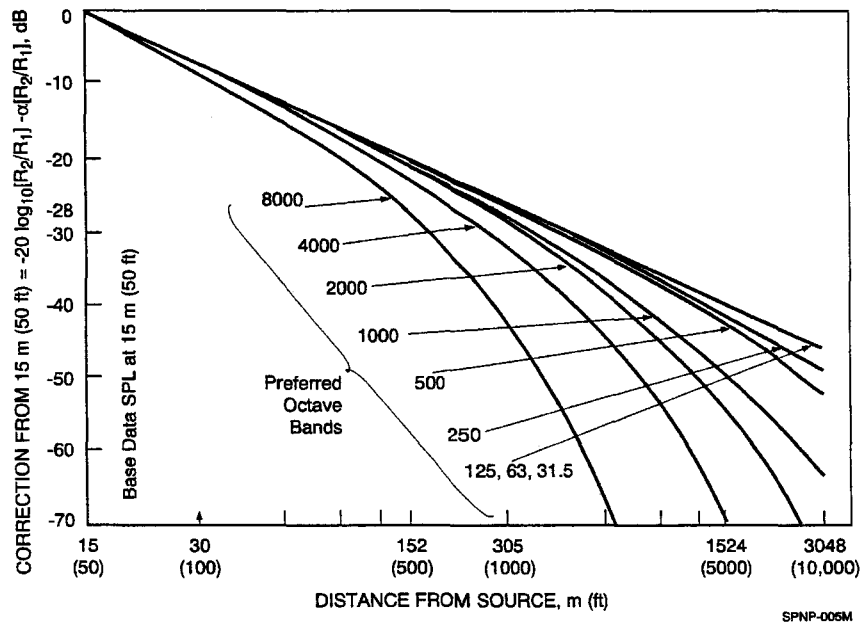


Figure 4. Corrections of Octave Band Sound Pressure Levels for Distance

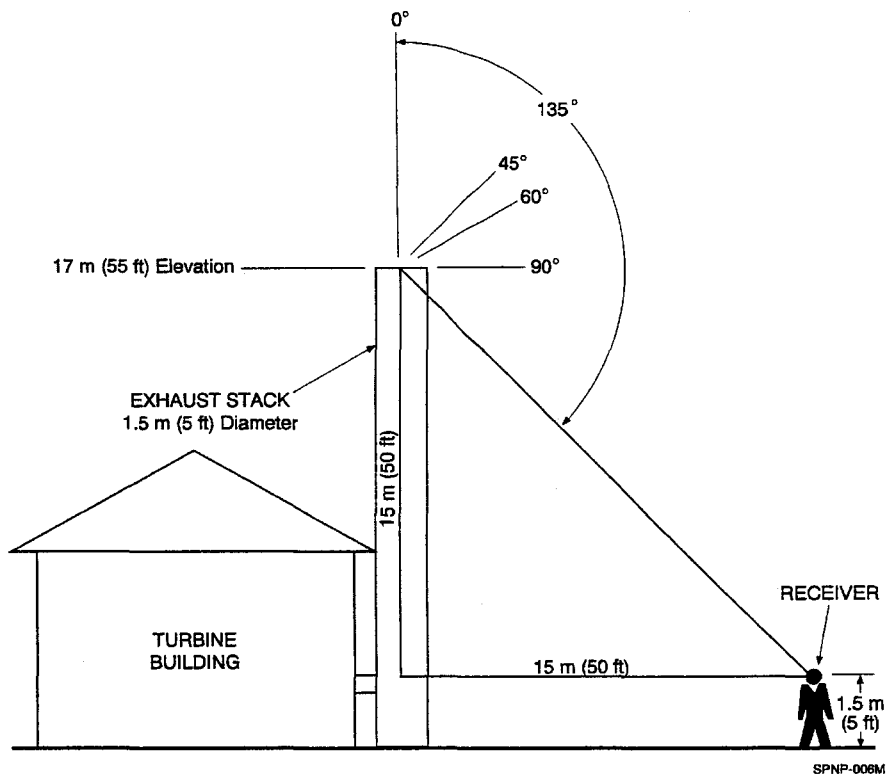


Figure 5. Exhaust Stack Directivity

Table 2. Stack Directivity

Duct Diameter >3 m (10 ft)									
Degree	Octave Band Center Frequency, Hz								
	31.5*	63	125	250	500	1000	2000	4000	8000
0	6	8	8	8	9	9	10	10	10
45	4	5	5	5	6	6	7	7	7
60	1	2	2	2	1	1	-1	-1	-1
90	-2	-3	-3	-3	-9	-9	-14	-14	-14
135	-3	-4	-4	-4	-11	-11	-18	-18	-18
Duct Diameter 1 m (3 ft) ≤ D ≤ 3 m (10 ft)									
Degree	Octave Band Center Frequency, Hz								
	31.5*	63	125	250	500	1000	2000	4000	8000
0	3	4	4	4	5	5	6	6	6
45	1	2	2	2	3	3	4	4	4
60	0	0	0	0	-1	-1	-2	-2	-2
90	-1	-2	-2	-2	-4	-4	-8	-8	-8
135	-2	-3	-3	-3	-7	-7	-12	-12	-12

* 31.5 Hz values are estimated. AGA (1969) does not include this octave band.

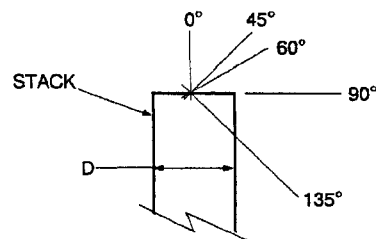
Example: What is the directivity effect in the 8000-Hz octave band at a measurement position 15 m (50 ft) from the centerline of a 17 m (55 ft) high exhaust stack? The exhaust stack diameter is 1.5 m (5 ft). Referring to Figure 5, the angle from the vertical is 135 degrees. From Table 2 the directivity effect is -12 dBA for 135 degrees. However, the sound from the exhaust of the gas turbine is given for 90 degrees. The directivity for 90 degrees is -8 dBA. Therefore, the directivity effect for this example is the difference between 90 and 135 degrees (Figure 6):

Equation (3)

$$\text{Directivity Effect} = (-12) - (-8) = -4, \text{ dBA}$$

Assuming an exhaust sound pressure level (SPL) at 15 m (50 ft) of 67 dBA and an exhaust silencer insertion loss of -17 dBA, the correct 8000-Hz octave band SPL at the observer is:

Exhaust SPL at 15 m (50 ft)	67 dBA
Exhaust silencer insertion loss	-17 dBA
Directivity Effect 135 degrees vs 90 degrees	<u>-4 dBA</u>
SPL at the receiver	46 dBA



SPNP-015M

Figure 6. Stack Directivity Example

The footnote in the reference (Table 34, AGA 1969) allows the values in the 90 degrees and 135 degrees columns to be increased by 50% for an air intake opening.

3.5 COMBINING SOUND LEVELS

Sound levels are combined when calculating:

- Sound level from two or more sources
- Sound level from a noise source and the ambient sound level
- Overall sound pressure level or sound power level from octave band levels

- A-weighted sound level from an A-weighted octave band spectrum

Levels are combined logarithmically, not arithmetically. Thus, two noise sources each producing 90 dBA combine to produce 93 dBA, not 180. Sound levels from multiple sources can be calculated with Eq. 4. Alternatively, the procedure described in Examples 1 and 2 using Figure 7 (Harris, 1979) can be used. L_1 is the higher of the two.

Equation (4)

$$L_{p_T} = 10 \log_{10} \left(\sum_i^n 10^{(L_{p_i}/10)} \right), \text{dB}$$

where: n = Number of sources
 L_{p_i} = Sound level of i th source
 L_{p_T} = Sum of all sound sources

The left scale shows the number of decibels to be added to the higher level L_1 to obtain the levels of the combination of L_1 and L_2 . Assume two noise sources of equal amplitude. The right scale of the chart shows the difference between the two noise sources is 0 dBA. On the left side, read 3 dBA, the number of decibels to be added to the louder noise source L_1 . In this example, because the two noise sources are equal, it does not matter which one is designated L_1 .

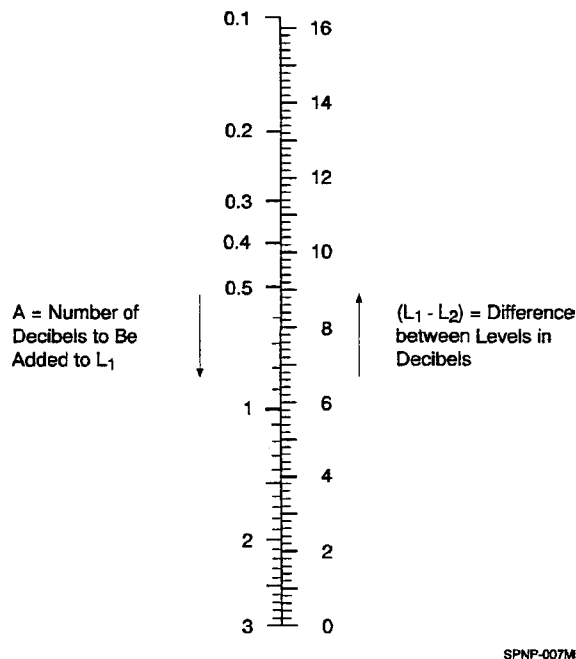


Figure 7. Combining Two Sound Levels, L_1 and L_2

Example 1. Assume three noise sources, each contributing the sound levels of: Source 1, 85 dBA; Source 2, 86 dBA; and Source 3, 92 dBA.

Referring to Figure 7, the difference between 85 and 86 dBA is 1 dBA. Therefore, add 2.5 dBA to the higher number, 86 dBA, to get 88.5 dBA. Then, take the difference between 92 dBA and 88.5 dBA, which is 3.5 dBA. From Figure 7, add 1.6 dBA to the higher number, 92 dBA, to get 93.6 dBA as follows:

$$86 - 85 = 1 \text{ (from Figure 7, difference is 2.5 dBA)}$$

$$86 + 2.5 = 88.5$$

$$92 - 88.5 = 3.5 \text{ (from Figure 7, difference is 1.6 dBA)}$$

$$92 + 1.6 = 93.6 \text{ (round to 94)}$$

In the operation to combine sound levels, it is acceptable to use tenths of a dBA. After calculating the combined sound levels, round off the result to the nearest dBA. This is depicted graphically in Figure 8:

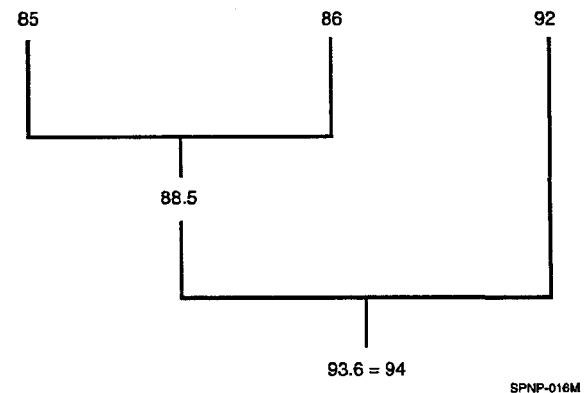


Figure 8. Example of Combining Sound Levels

Because of the approximate nature of noise analyses, it is pointless to present results calculated to the tenth of a dBA.

Example 2. Assume that the octave band sound pressure levels have been calculated for the inlet and exhaust at a receiver and, now, must be summed to calculate the A-weighted sound level (Table 3).

First, the A-weighting correction must be made to each octave band using Table 4 and then summed to get the A-weighted sound level, 52 dBA.

Table 3. Example of Summing Octave Band Sound Pressure Levels

Sound Level	Octave Band Center Frequency, Hz									dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Inlet/Exhaust, dBA	72	69	60	51	43	37	36	35	49	--
A-Weighted Corrections, dBA (from Table 4)	-39	-26	-16	-9	-3	0	+1	+1	-1	--
A-Weighted dBA	33	43	44	42	40	37	37	36	48	52

Table 4. A-Weighted Octave Band Corrections

Sound Level	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
A-Weighted Corrections, dBA	-39	-26	-16	-9	-3	0	+1	+1	-1

To sum the A-weighted octave band sound pressure levels, use Figure 7 to obtain the differences between noise levels, adding the difference to the higher noise level, and proceed through all of the octave bands until the summation is complete, as depicted in Figure 9. Again, round off the combined sound level (51.8) to the nearest dBA (52 dBA).

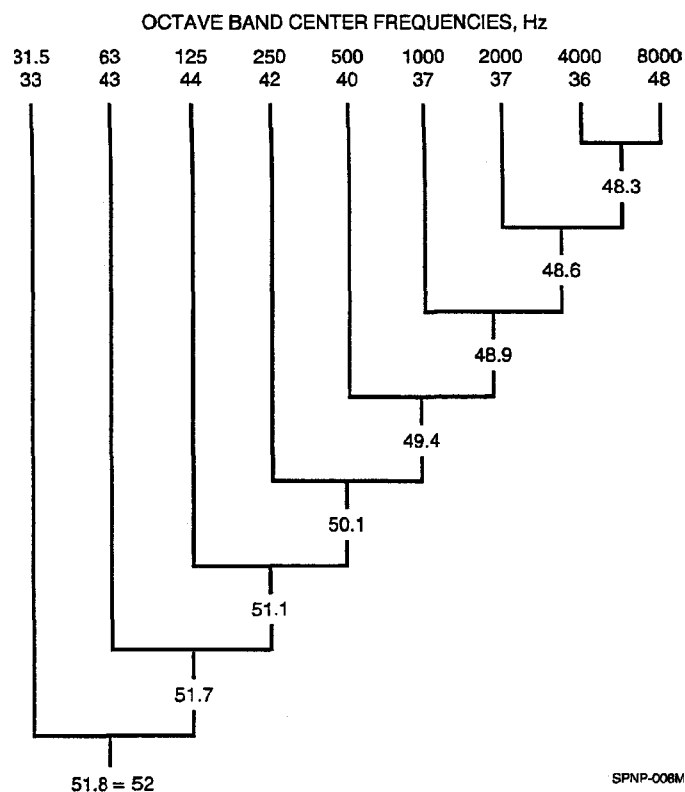


Figure 9. Combining Sound Levels

4 Noise Data

The noise levels of Solar's gas turbines are given in Tables 5 through 14. The exhaust measurement position (Figure 10) is 90 degrees from the exhaust stack centerline on the plane of the outlet flange. The air inlet measurement position (Figure 11) is on the centerline of the inlet duct flange. Noise levels for both unenclosed and enclosed packages apply at 1 m (3 ft) from the skid and 1.5 m (5 ft) above the bottom of the skid (Figure 12), and are based on free-field conditions. Because these are averaged levels, the noise level at some locations around the skid (or enclosure) will be higher, and at some locations lower, than the average noise level. Table 15 gives the octave band insertion losses for the combustion air inlet cleaners. Table 16 gives lube oil cooler noise levels at 15 m (50 ft). Tables 17 through 20 give octave band insertion losses for standard inlet and exhaust silencers. Sound pressure levels are referenced to $20 \mu\text{Pa}$ ($2 \times 10^{-5} \text{ N/m}^2$).

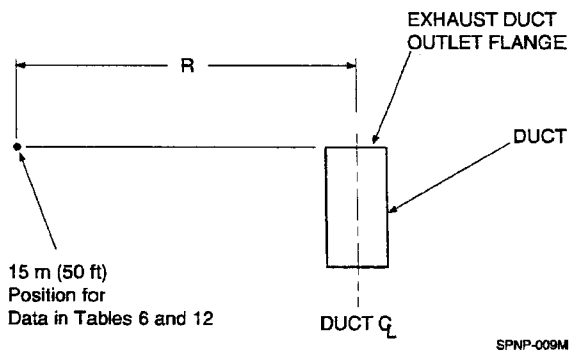


Figure 10. Exhaust Measurement Position

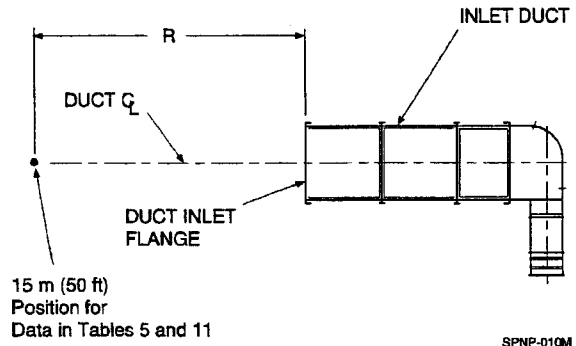


Figure 11. Inlet Measurement Position

All product noise data are exclusive of the contribution from the lube oil cooler.

Tables 5 through 10 apply to gas turbines operating at full load. Noise levels from two-shaft SoLoNOx™ gas turbines can be higher when operating at less than full load, and the part-load noise levels are given in Tables 11 through 14. Octave band sound pressure levels do not change uniformly with changes in load; i.e., the sound pressure level change in any octave band can be more, or less, than the change in other octave bands. Because of this, the part-load octave band sound pressure levels given in Tables 11 through 14 are the highest sound pressure levels expected for those octave bands, regardless of the gas turbine's load conditions. The A-weighted sound levels in Tables 11 through 14 are calculated from the octave band sound pressure levels.

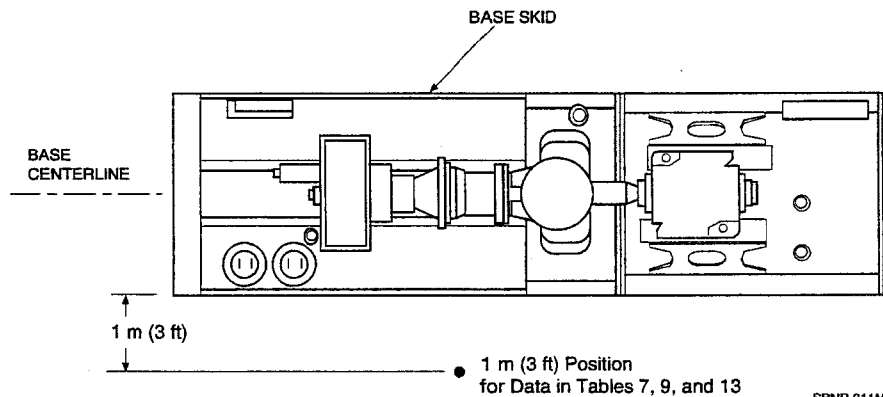


Figure 12. Casing Measurement Position

A description of each table follows:

Table 5 – Unsilenced octave band sound pressure levels and A-weighted sound levels at 15 m (50 ft) from the combustion air inlet for full-load operation.

Table 6 – Unsilenced octave band sound pressure levels and A-weighted sound levels at 15 m (50 ft) from the combustion exhaust for full-load operation. Using ISO 10494, unsilenced sound power levels were obtained for the exhaust of the *Centaur* 40, *Centaur* 50, and *Taurus* 60 gas turbines using a 1.22 m (4 ft) diameter stack, and on the *Taurus* 70 using a 1.32 m (4 ft-4 in.) diameter stack. *Mars* and *Titan* exhaust sound power levels are calculated using an algorithm calibrated from noise measurements made on the *Centaur* 40, *Centaur* 50 and *Taurus* 60 gas turbines and verified with the *Taurus* 70 gas turbine. The exhaust duct diameter for the *Mars* and *Titan* gas turbines is 1.52 m (5 ft). The octave band sound pressure levels in the table were obtained by extrapolating the sound power levels to 15 m (50 ft) using hemispherical divergence. The sound levels given in this table are at the 95% upper confidence limit.

Table 7 – Averaged octave band sound pressure levels and A-weighted sound levels at 1 m (3 ft) from the base skid and at 1.5 m (5 ft) above the skid bottom for an unenclosed package operating at full load.

Table 8 – Averaged octave band sound pressure levels and A-weighted sound levels at 15 m (50 ft) from the base skid and at 1.5 m (5 ft) high for an unenclosed package operating at full load. The sound levels in this table are calculated from the sound levels in Table 7, using the algorithm described in Section 6, "Source Sound Power Levels."

Table 9 – Averaged octave band sound pressure levels and A-weighted sound levels at 1 m (3 ft) from the base skid and at 1.5 m (5 ft) above the skid bottom for an enclosed package operating at full load.

Table 10 – Averaged octave band sound pressure levels and A-weighted sound levels at 15 m (50 ft) from the enclosure and at 1.5 m (5 ft) high for an enclosed package operating at full load. The sound levels in this table are calculated from the sound levels in Table 8, using the algo-

rithm described in Section 6, "Source Sound Power Levels."

Table 11 – Unsilenced octave band sound pressure levels and A-weighted sound levels at 15 m (50 ft) from the combustion air inlet for less than full-load operation. This affects the *Taurus*, *Mars* and *Titan* two-shaft gas turbines only.

Table 12 – Unsilenced octave band sound pressure levels and A-weighted sound levels at 15 m (50 ft) from the combustion exhaust for less than full-load operation. This affects the *Taurus*, *Mars* and *Titan* two-shaft gas turbines only.

Table 13 – Averaged octave band sound pressure levels and A-weighted sound levels at 15 m (50 ft) from the base skid for an unenclosed package operating at part load. This affects the *Taurus*, *Mars* and *Titan* two-shaft gas turbines only.

Table 14 – Averaged octave band sound pressure levels and A-weighted sound levels at 1 m (3 ft) from the base skid for an unenclosed package operating at part load. The sound levels in this table are calculated from the sound levels in Table 13, using the algorithm described in Section 6, "Source Sound Power Levels." This affects the *Taurus*, *Mars* and *Titan* two-shaft gas turbines only.

Table 15 – Although the lube oil coolers are defined as 90 or 100 dBA sound power level, the noise data in this table are given as octave band sound pressure levels and A-weighted sound levels at 15 m (50 ft). The 90 dBA sound power level oil cooler is a special cooler; the 100 dBA sound power level cooler is the standard oil cooler.

Table 16 – Combustion air filter insertion losses.

Table 17 – Combustion air inlet silencer insertion losses for Oil & Gas applications.

Table 18 – Combustion air inlet silencer insertion losses for Power Generation applications.

Table 19 – Combustion exhaust silencer insertion losses for Oil & Gas applications.

Table 20 – Combustion exhaust silencer insertion losses for Power Generation applications.

Tables 17 through 20 include Solar's standard silencers. Special silencers designed to meet more stringent insertion loss requirements are available.

Table 5. Sound Pressure Levels – Unsilenced Combustion Air Inlet at 15 m (50 ft), Full Load

Model	Octave Band Center Frequency, Hz									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Saturn 10	70	72	74	78	82	89	91	95	106	106
Saturn 20	72	74	76	80	84	91	93	97	108	108
Centaur 40	75	81	87	88	89	91	94	117	109	118
Centaur 50	75	81	87	88	89	91	94	118	110	119
Mercury 50	74	80	86	87	88	90	93	116	108	117
Taurus 60	76	82	88	89	90	92	95	120	112	121
Taurus 70	79	85	91	92	93	95	98	126	118	127
Mars 90	81	87	93	94	95	97	100	125	117	126
Mars 100	81	87	93	94	95	97	100	129	121	130
Titan 130	82	88	94	95	96	98	101	131	123	132

Sound pressure levels (Re 20 μ Pa) for SoLoNOx and conventional gas turbine packages

Table 6. Sound Pressure Levels – Unsilenced Combustion Exhaust at 15 m (50 ft), Full Load

Model	Octave Band Center Frequency, Hz									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Saturn 10	93	93	92	91	89	88	84	80	69	92
Saturn 20	94	94	93	92	90	89	85	81	70	93
Centaur 40	84	92	88	90	89	88	81	72	66	91
Centaur 50	86	88	88	87	94	88	82	70	61	93
Mercury 50	63	75	71	69	75	65	54	41	32	73
Taurus 60	88	91	88	91	95	87	80	72	64	94
Taurus 70	91	94	91	95	97	93	87	80	67	98
Mars 90	91	95	93	96	100	95	87	77	67	100
Mars 100	91	95	93	96	100	95	87	77	67	100
Titan 130	92	96	94	97	101	96	88	78	68	101

Sound pressure levels (Re 20 μ Pa) for SoLoNOx and conventional gas turbine packages

Table 7. Sound Pressure Levels – Unenclosed Package at 1 m (3 ft), Full Load

Model	Octave Band Center Frequency, Hz									dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Saturn 10	85	90	91	94	94	90	90	91	93	98
Saturn 20	86	91	92	95	95	91	91	92	94	99
Centaur 40	94	94	97	99	99	94	92	91	92	101
Centaur 50	94	94	97	99	99	94	92	91	92	101
Mercury 50	79	81	84	88	84	84	86	90	83	94
Taurus 60	94	94	97	99	99	94	92	91	92	101
Taurus 70	94	94	97	99	99	94	102	100	95	106
Mars 90	87	86	92	92	95	93	102	100	95	106
Mars 100	87	86	92	92	95	93	102	100	95	106
Titan 130	93	92	100	97	94	90	91	103	96	105

Package average sound pressure levels (Re 20 μ Pa) for SoLoNOx and conventional gas turbine packages

Table 8. Sound Pressure Levels – Unenclosed Package at 15 m (50 ft), Full Load

Model	Octave Band Center Frequency, Hz									dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Saturn 10	71	76	77	80	80	76	76	77	79	84
Saturn 20	72	77	78	81	81	77	77	78	80	85
Centaur 40	81	81	84	86	86	81	79	78	79	88
Centaur 50	81	81	84	86	86	81	79	78	79	88
Mercury 50	67	69	72	76	72	72	74	78	71	82
Taurus 60	81	81	84	86	86	81	79	78	79	88
Taurus 70	82	82	85	87	87	82	90	88	83	94
Mars 90	75	74	80	80	83	81	90	88	83	94
Mars 100	75	74	80	80	83	81	90	88	83	94
Titan 130	82	81	89	86	83	79	80	92	85	94

Package average sound pressure levels (Re 20 μ Pa) for SoLoNOx and conventional gas turbine packages

Table 9. Sound Pressure Levels – Enclosed Package at 1 m (3 ft), Full Load

Model	Octave Band Center Frequency, Hz									dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Saturn 10	84	83	86	82	80	76	75	89	76	90
Saturn 20	84	83	86	82	80	76	75	89	76	90
Centaur 40	84	86	86	88	83	78	74	76	71	85
Centaur 50	85	86	84	85	81	77	73	72	64	83
Mercury 50	86	87	84	83	78	76	70	74	68	82
Taurus 60	85	78	79	80	81	77	77	73	66	83
Taurus 70	96	89	86	83	81	80	78	75	70	85
Mars 90	96	89	86	83	81	80	78	75	70	85
Mars 100	96	89	86	83	81	80	78	75	70	85
Titan 130	96	89	86	83	81	80	78	75	70	85

Package average sound pressure levels (Re 20 μ Pa) for SoLoNOx and conventional gas turbine packages
For enclosed *Mars* and *Titan* gas turbine packages, acoustical lagging is required for the combustion air inlet ducting.

Table 10. Sound Pressure Levels – Enclosed Package at 15 m (50 ft), Full Load

Model	Octave Band Center Frequency, Hz									dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Saturn 10	70	69	72	68	66	62	61	75	62	76
Saturn 20	70	69	72	68	66	62	61	75	62	76
Centaur 40	71	73	73	75	70	65	61	63	58	72
Centaur 50	72	73	71	72	68	64	60	59	51	70
Mercury 50	73	74	72	73	69	65	61	60	52	71
Taurus 60	72	65	66	67	68	64	64	60	53	70
Taurus 70	84	77	74	71	69	68	66	63	58	73
Mars 90	84	77	74	71	69	68	66	63	58	73
Mars 100	84	77	74	71	69	68	66	63	58	73
Titan 130	85	78	75	72	70	69	67	64	59	74

Package average sound pressure levels (Re 20 μ Pa) for SoLoNOx and conventional gas turbine packages
For enclosed *Mars* and *Titan* gas turbine packages, acoustical lagging is required for the combustion air inlet ducting.

Table 11. Sound Pressure Levels – Unsilenced Combustion Inlet at 15 m (50 ft), Less than Full Load

Model	Octave Band Center Frequency, Hz									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Taurus 60	78	83	93	95	95	98	103	133	116	134
Taurus 70	81	86	96	98	98	101	106	139	122	140
Mars 90	81	87	94	94	95	98	101	135	126	136
Mars 100	81	87	94	94	95	98	101	135	126	136
Titan 130	82	88	95	95	96	99	102	137	129	138

Sound pressure levels (Re 20 μ Pa) for *Taurus*, *Mars* and *Titan* two-shaft gas turbine packages only

Table 12. Sound Pressure Levels – Unsilenced Combustion Exhaust at 15 m (50 ft), Less than Full Load

Model	Octave Band Center Frequency, Hz									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Taurus 60	89	91	88	91	98	93	82	73	64	97
Taurus 70	96	98	96	98	102	107	106	95	80	111
Mars 90	92	95	93	96	102	101	89	78	67	103
Mars 100	92	95	93	96	102	101	89	78	67	103
Titan 130	93	96	94	97	104	102	90	79	68	105

Sound pressure levels (Re 20 μ Pa) for *Taurus*, *Mars* and *Titan* two-shaft gas turbine packages only

Table 13. Sound Pressure Levels – Unenclosed Package at 1 m (3 ft), Less than Full Load

Model	Octave Band Center Frequency, Hz									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Taurus 60	98	92	95	100	109	98	92	90	95	107
Taurus 70	91	91	100	100	104	102	110	104	101	113
Mars 90	84	83	95	93	100	100	110	104	101	113
Mars 100	84	83	95	93	100	100	110	104	101	113
Titan 130	84	83	95	93	100	100	110	104	101	113

Sound pressure levels (Re 20 μ Pa) for *Taurus*, *Mars* and *Titan* two-shaft gas turbine packages only

Table 14. Sound Pressure Levels – Unenclosed Package at 15 m (50 ft), Less than Full Load

Model	Octave Band Center Frequency, Hz									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Taurus 60	85	79	82	87	96	85	79	77	82	94
Taurus 70	72	71	83	81	88	88	98	92	89	101
Mars 90	72	71	83	81	88	88	98	92	89	101
Mars 100	72	71	83	81	88	88	98	92	89	101
Titan 130	73	72	84	82	89	89	99	93	90	102

Sound pressure levels (Re 20 μ Pa) for *Taurus*, *Mars* and *Titan* two-shaft gas turbine packages only

Table 15. Sound Pressure Levels – Lube Oil Cooler at 15 m (50 ft)

Lube Oil Cooler, Sound Power Level	Octave Band Center Frequency, Hz									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
90 dBA (special)	63	70	67	60	55	52	48	44	39	58
100 dBA (standard)	73	80	77	70	65	62	58	54	49	68

Table 16. Combustion Air Inlet Air Filter Insertion Losses

Air Filter	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Pulse Cleaning, Up-Draft, dBA	2	4	8	9	13	26	27	27	33
Pulse Cleaning, Cross-Flow, dBA	0	3	5	7	12	9	18	17	24
Barrier, dBA	0	2	3	4	4	5	8	3	18
Marine, dBA	0	1	2	1	2	5	6	9	8

Table 17. Inlet Silencer Insertion Losses for Oil & Gas Applications

Model	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Saturn	0	1	2	3	15	25	48	55	37
Centaur & Taurus 60	1	2	3	4	17	32	46	47	31
Taurus 70	1	2	4	6	22	43	47	55	52
Mars	2	4	7	16	40	50	51	55	55
Titan	3	7	13	23	40	54	57	59	48

Table 18. Inlet Silencer Insertion Losses for Power Generation Applications

Model	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Saturn	0	1	2	3	15	25	48	55	37
Centaur & Taurus 60	1	2	3	4	18	38	46	54	50
Taurus 70	1	3	7	11	20	40	55	53	41
Mars	3	6	15	24	35	55	55	55	45
Titan	0	1	5	8	27	48	55	61	60

Table 19. Exhaust Silencer Insertion Losses for Oil & Gas Applications

Model	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Saturn	0	1	4	8	13	19	17	14	8
Centaur & Taurus 60	1	2	6	12	17	21	19	14	10
Centaur & Taurus 60 (floor standing)	2	4	9	19	26	29	23	20	13
Taurus 70	2	4	8	16	22	26	22	19	12
Taurus 70 (floor standing)	2	5	11	22	30	36	34	29	13
Mars (1.5 m (5 ft) long)	1	3	6	11	16	18	19	19	17
Mars (3 m (10 ft) long)	3	5	10	19	28	34	34	33	22
Titan	1	6	10	20	35	38	36	24	16

Table 20. Exhaust Silencer Insertion Losses for Power Generation Applications

Model	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Saturn (floor standing)	3	5	11	19	22	28	26	17	14
Centaur & Taurus 60	1	2	6	12	17	21	19	14	10
Centaur & Taurus 60 (floor standing)	2	4	9	19	26	29	23	20	13
Taurus 70	2	5	10	16	21	26	26	24	17
Taurus 70 (floor standing)	2	5	11	22	30	36	34	29	13
Mars	1	3	6	11	16	18	19	19	17
Titan	1	6	10	20	35	38	36	24	16

5 Sample Calculations

Calculate the octave band sound pressure levels and the A-weighted sound level from the combustion air inlet and exhaust and the oil cooler of a *Centaur* 40 gas turbine compressor set at a receiver 152 m (500 ft) from the site. The exhaust stack is 12.2 m (40 ft) high. Assume that the ground elevation at the receiver is the same as the site (see Figure 13). Because the receiver height above ground is 1.5 m (5 ft) (by convention), subtract the 1.5-m (5-ft) receiver height from the 12.2-m (40-ft) stack height to get 10.7 m (35 ft). Now, calculate the angle from the top of the exhaust stack to the receiver:

Equation (5)

$$\theta = \tan^{-1} (10.7 \text{ m}/152 \text{ m}) = 4 \text{ degrees}$$

$$\theta = \tan^{-1} (35 \text{ ft}/500 \text{ ft}) = 4 \text{ degrees}$$

Checking the directivity of the exhaust stack in Figure 5, 94 degrees compared with 90 degrees is insignificant, so a directivity correction will not be made.

Site data will be filled in on the Noise Analysis Form (Figure 14). From Table 5, enter the octave band sound pressure levels for the *Centaur* 40 gas turbine inlet in Line 1 of the Noise Analysis Example (Figure 15). Next, enter the octave band insertion losses for an inlet filter from Table 16 in Line 2. For this example, the pulse cleaning up-draft type has been selected. Then, enter the octave band insertion losses for an inlet silencer from Table 17 (*Centaur* and *Taurus* 60) in Line 3. Select the distance attenuation from

Figure 4 for 152 m (500 ft). Enter the distance attenuation values in Line 4. Subtract the air filter and inlet silencer insertion losses and the distance attenuation from the inlet noise levels in Line 1, and enter the results in Line 5.

Now, repeat the procedure for the exhaust. Using the exhaust octave band sound pressure levels from Table 6 for the *Centaur* 40 gas turbine, enter the exhaust sound levels in Line 6. Enter the insertion losses for the exhaust silencer from Table 19 (*Centaur* and *Taurus* 60) in Line 7. Enter the distance attenuation (the same as previously determined for the inlet) in Line 8. Subtract the exhaust silencer insertion losses and the distance attenuation from the exhaust noise levels in Line 6, and enter the results in Line 9.

Next, enter the lube oil cooler sound pressure levels from Table 15 in Line 10. For this example, the 100 dBA sound power level cooler has been selected. Enter the distance attenuation in Line 11 (it is the same for the inlet and exhaust systems). Subtract the distance attenuation in Line 11 from the oil cooler sound levels in Line 10, and enter the result in Line 12.

Finally, combine the sound levels in Lines 5, 9 and 12 by logarithmically summing the octave band sound pressure levels in these three lines. This can be accomplished by using Figures 7 and 9 and following the procedure described in Section 3.5, "Combining Sound Levels." Enter the combined octave band sound pressure levels in Line 13.

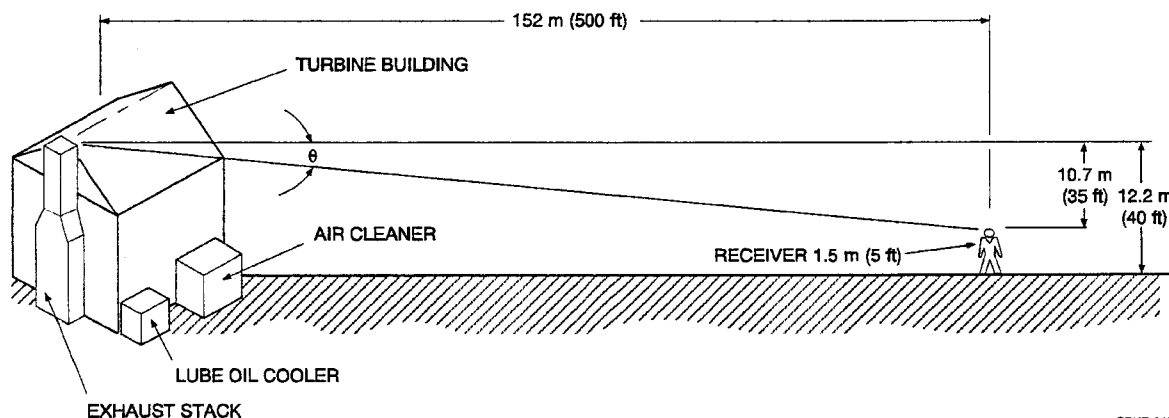


Figure 13. Site Example

Customer:								Date:			
Subject:								Project No.:			
Engineer:											
Line	Source	Octave Band Center Frequency, Hz									
		31.5	63	125	250	500	1000	2000	4000	8000	dBA
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											

Figure 14. Noise Analysis Form

Customer: Super Pipelines, Inc.								Date: 10 October 2003			
Subject: Centaur 40 Inlet, Exhaust and Oil Cooler @152 m (500 ft)								Project No.: 12345			
Engineer: Solar Turbines Incorporated											
Line	Source	Octave Band Center Frequency, Hz									
		31.5	63	125	250	500	1000	2000	4000	8000	dBA*
1	Inlet Lp @15 m (50 ft), dBA (Table 5)	75	81	87	88	89	91	94	117	109	118
2	Pulse Cleaning Up-Draft Air Filter, dBA (Table 16)	-2	-4	-8	-9	-13	-26	-27	-27	-33	—
3	Inlet Silencer, dBA (Table 17)	-1	-2	-3	-4	-17	-32	-46	-47	-31	—
4	Adjust to 152 m (500 ft), dBA (Figure 4)	-20	-20	-20	-20	-20	-21	-21	-23	-28	—
5	Net Inlet Lp @152 m (500 ft), dBA (add lines 1 to 4)	52	55	56	55	39	12	0	20	17	48
6	Exhaust Lp @15 m (50 ft), dBA (Table 6)	84	92	88	90	89	88	81	72	66	91
7	Exhaust Silencer (Table 19)	-1	-2	-6	-12	-17	-21	-19	-14	-10	—
8	Adjust to 152 m (500 ft), dBA (Figure 4)	-20	-20	-20	-20	-20	-21	-21	-23	-28	—
9	Net Exhaust Lp @152 m (500 ft) (add lines 6 to 8)	63	70	62	58	52	46	41	35	28	55
10	100 dBA Oil Cooler Lp @15 m (50 ft) (Table 16)	73	80	77	70	65	62	58	54	49	68
11	Adjust to 152 m (500 ft), dBA (Figure 4)	-20	-20	-20	-20	-20	-21	-21	-23	-28	—
12	Net Cooler Lp @152 m (500 ft) (subtract line 11 from line 10)	53	60	57	50	45	41	37	31	21	48
13	Sum of Sources, dBA (add lines 5, 9 and 12)	64	71	64	60	53	47	42	37	29	56
14	3 Gas Turbines (Eq. 6)	5	5	5	5	5	5	5	5	5	—
15	Net, 3 Gas Turbines (add lines 13 and 14)	69	76	69	65	58	52	47	42	34	61
16	Octave Band A-Weighted Correction (Table 4)	-39	-26	-16	-9	-3	0	1	1	-1	—
17	A-Weighted Sound Level (subtract line 16 from line 15)	30	50	53	56	55	52	48	43	33	61

* To calculate an A-weighted sound level from an octave band sound pressure level, subtract the octave band A-weighted correction in Table 4 from the octave band sound pressure level, then add the resulting A-weighted octave band sound pressure level using Figure 9.

Figure 15. Noise Analysis Example

If there is more than one gas turbine package, the multiple package sound pressure levels can be increased by using Figure 7 or Eq. 5. In this example, three gas turbine packages are assumed, and the increase over one package is 5 dBA. Enter 5 dBA for each octave band in Line 14. Add Line 13 and Line 14 and enter the result in Line 15. Line 15 represents the octave band sound pressure levels for three gas turbine packages.

Finally, in Line 16, enter the A-weighted octave band sound pressure level corrections from Table 4. Subtract the A-weighted corrections in Line 16 from Line 15 and enter the result in Line 17. These are the A-weighted octave band sound pressure levels. Using the procedure described in Section 3.5, "Combining Sound Levels," logarithmically sum these A-weighted octave band sound pressure levels in Line 17 to get the A-weighted sound level and enter this value into the "dBA" column of Line 17.

It is recommended that the A-weighted sound level of each sound source (inlet, exhaust, and lube oil cooler) be calculated and entered in the "dBA" column for that source. The procedure is the same as the one described above for Lines 16 and 17. Having an A-weighted sound level for each source allows the evaluator to identify the sound source contributing the highest A-weighted sound level. If the calculated sound level of the sum of the three sources is too high, the sound source contributing the highest sound level to this sum can be reduced first. In the example, the exhaust A-weighted sound level (55 dBA) is the loudest source. If the exhaust silencer is replaced with a silencer that results in a 48 dBA exhaust sound level, the sum of the three sources would be reduced from 56 to 53 dBA. Likewise, the A-weighted sound level of the three gas turbines would be reduced from 61 to 58 dBA.

5.1 MORE THAN ONE GAS TURBINE

There may be more than one gas turbine at a site. If there are three, for example, Eq. 5 and the procedure described below can be used to incrementally increase the noise level from one gas turbine to three:

Equation (6)

$$L_{pN} = 10 \log_{10} N, \text{ dBA}$$

where:

L_{pN} = Increase in noise level produced
by N number of identical noise
sources (gas turbines)

N = Number of noise sources
(gas turbines)

For three gas turbines, $L_{pN} = L_{p3} = 5$ dBA. In the example in Figure 15, the increase in noise level for three gas turbines (Line 14) has been calculated logarithmically, but the increase has been added algebraically to the sum of the sources (Line 13) to get the noise level of three gas turbines (Line 15).

5.2 CALCULATING THE DAY-NIGHT SOUND LEVEL (L_{dn})

If the day/night sound level is desired, calculate it using Eq. 7:

Equation (7)

$$L_{dn} = 10 \log_{10} \left[\frac{1}{24} \left(\sum_{i=1}^{15} 10^{(L_{A_i}/10)} + \sum_{i=16}^{24} 10^{((L_{A_i}+10)/10)} \right) \right], \text{ dB}$$

where: L_A = A-weighted sound level

The first term in the equation is summed over 15 hours using the calculated A-weighted sound level. The second term is summed over 9 hours using the A-weighted sound level plus 10 dBA. The 15-hour summation represents the time from 7 a.m. to 10 p.m. The 9-hour summation represents the time from midnight to 7 a.m. plus the time from 10 p.m. to midnight. This is because the day/night sound level is calculated for one day, a 24-hour period from midnight to midnight, with the nighttime hours (midnight to 7 a.m. and 10 p.m. to midnight) weighted by adding 10 dBA to them.

From Line 17 in Figure 15, the A-weighted sound level is 61 dBA. Using Eq. 7, the day/night sound level is calculated to be 67.4 dBA, rounded to 67 dBA.

6 Source Sound Power Levels

Although unsilenced sound pressure levels from the inlet, exhaust and casing of the gas turbine package are given in this document, customers sometimes request source sound power levels instead. Source sound power levels are properly determined from sound pressure levels, or sound intensity levels, that have been measured in accordance with a test standard specifically intended for use in calculating sound power levels. With the exception of the exhaust sound data, the sound pressure levels in this document were not measured with the intent of using them to calculate source sound power levels. Sound power levels calculated as described in this section for the casing and combustion air inlet will not be as accurate as levels obtained from the test procedures described in appropriate standards.

When source sound power levels are requested, they are calculated from the sound pressure levels in Tables 5, 6, 11 and 12, using Eq. 8, and in Tables 7, 9 and 13 using Eq. 9:

Equation (8)

$$L_w = L_p + 20 \log_{10} R + K, \text{ dBA}$$

where:

- L_w = Sound power level
- L_p = Sound pressure level from Table 5 or 11 (inlet) and Table 6 or 12 (exhaust)
- R = 15 m (50 ft)
- K = -8 dBA for R in meters
(+2.4 dBA for R in feet)

Calculating the casing sound power level for the unenclosed package or for the enclosed package requires knowledge of the package dimensions (length, width and height). The calculation uses the following procedure:

1. Add 2.0 m to the length and width. For enclosed packages, add 1.0 m to the height. For unenclosed packages, assume the package is enclosed and add 1.0 m to the equivalent enclosed package height.
2. Calculate the surface area (S) of a parallelepiped created with these larger dimensions (Figure 16).

3. Calculate the package sound power level using Eq. 9:

Equation (9)

$$L_w = L_p + 10 \log_{10} S, \text{ dBA}$$

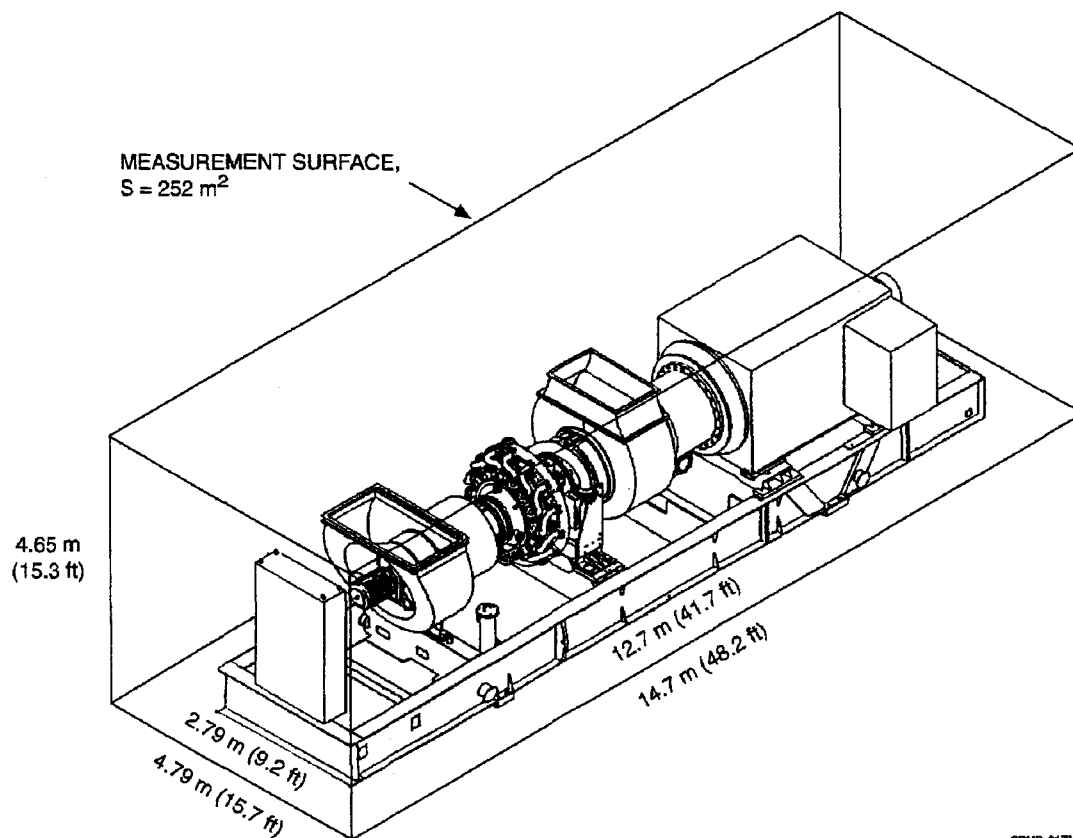
where:

- L_w = Sound power level
- L_p = Sound pressure level from Table 7, 8, 13 or 14 (unenclosed) or from Table 9 or 10 (enclosed)
- S = Parallelepiped area in square meters

The exhaust sound pressure levels in Tables 6 and 12 are calculated from sound power levels obtained from sound measurements taken in accordance with ISO Standard 10494 and extrapolated to 15 m (50 ft) using hemispherical divergence. Therefore, sound power levels calculated from the data in Tables 6 and 12 using Eq. 8 and $R = 15$ m (50 ft) are the sound power levels obtained from the procedure defined in ISO Standard 10494 (1993).

The inlet sound pressure levels were measured at 15 m (50 ft) from the inlet duct flange, on the duct centerline, as shown in Figure 11. This measurement position is the location from which the inlet sound power levels are calculated: $R = 15$ m (50 ft).

The casing sound pressure levels were measured from positions around the base skid and averaged to obtain the values in the data tables. The location from which the casing sound power levels are calculated is shown in Figure 12. Note that directivity effects are not included in the calculation of the source sound power levels described above. Directivity effects are not included in the averaging of the casing sound pressure levels given in the data tables and there is no advantage gained by considering the directivity effects when calculating the casing sound power levels. For the inlet and exhaust noise, directivity effects should be employed when the noise receiver is not in line with the noise source and the measurement position, as shown in Figures 10 and 11. To calculate the directivity effect for the inlet or exhaust sources, use Figure 5 and follow Example 1 under Section 3.4, "Directivity Effects."



(Measurement surface extends 1.0 m (3 ft) from base skid and 1.0 m (3 ft) above equivalent height of enclosed package.)

Figure 16. Power Generation Package with Sound Measurement Surface

7 Appendix

7.1 OCCUPATIONAL NOISE EXPOSURE STANDARDS

The workplace noise standards in most countries specify an 8-hour exposure limit of 85 dBA, although some have a 90 dBA limit. In these standards, the 8-hour exposure limit above which engineering or administrative controls must be applied is also 85 to 90 dBA. Some countries apply an 8-hour exposure limit of 80 dBA while utilizing an 85 dBA 8-hour exposure limit for the application of engineering and administrative controls. Discussed below are three workplace noise standards: The United States Occupational Noise Exposure Standard and the European Union's Council Directives 86/188/EEC and 2003/10/EC. Please refer to these for a complete explanation of the their requirements.

These standards apply to the sound levels in the workplace. They do not establish limits for the sound levels from machinery or other equipment. It is popularly assumed that a requirement for machinery to meet the OSHA or the EU standards means that workplace sound levels from the machinery will not exceed 85 dBA. However, the sound level in the workplace is a function of the workplace environment and the number and sound levels of the other machines in the workplace. Workplace sound levels equal to or greater than 85 dBA can be in compliance with these standards, if the provisions of the standards are met.

7.1.1 United States Occupational Noise Exposure Standard

The U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Noise Exposure Standard of May 29, 1971 established a standard for noise exposure in the workplace. This standard was amended on March 8, 1983 with the addition of the Hearing Conservation Amendment, which described conditions and requirements for hearing conservation programs and lowered the 8-hour exposure action level from a sound level exceeding 90 dBA to a sound level equal to or greater than 85 dBA. This standard is known as the OSHA standard.

OSHA Standard

The OSHA standard requires protection against the effects of noise exposure when the sound levels exceed those shown in Table 21 (Table G-16 from the standard), when measured on the A scale of a sound level meter at slow response.

The standard also allows determination of the A-weighted sound level from octave bands and it defines a procedure for this.

Table 21 defines permissible exposure levels. When these exposure levels are exceeded, the standard requires employers to implement feasible administrative or engineering controls. If these controls do not reduce the sound levels within the levels of Table 21, the employer must provide personal protective equipment to employees and employees must wear them to reduce the exposure levels to the levels in the table.

Table 21. Permissible Noise Exposures

Duration per Day, hours	Sound Level, dBA slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: $C_1/T_1 + C_2/T_2 + \dots + C_n/T_n$ exceeds unity, then the mixed exposure should be considered to exceed the limit value. C_n indicates the total time of exposure permitted at that level and T_n indicates the total time of exposure permitted at that level.

Exposure to impulsive or impact noise should not exceed 140 dBA sound pressure level.

Hearing Conservation Program

The hearing conservation program is intended to minimize employee hearing loss from exposure to noise. The amendment to the OSHA standard requires implementation of a hearing conservation program when an employee's noise exposure equals or exceeds an 8-hour time-weighted

average A-weighted sound level of 85 dBA measured on the sound level instrument's slow response scale. The hearing conservation program is composed of:

1. Monitoring of the workplace noise levels
2. Notifying employees of the results of noise monitoring
3. Providing an opportunity for employees or their representatives to observe the noise measurements
4. Establishing and maintaining an audiometric testing program
5. Providing hearing protectors to employees
6. Maintaining a training program to inform employees of the effects of noise on hearing, the purpose of hearing protectors, including their use, fitting, care, and selection
7. Access to information and training materials
8. Maintaining accurate records of employee exposure measurements and employee audiometric test results

7.1.2 Council Directive 86/188/EEC

This directive of May 12, 1986 specifies two action levels: 85 and 90 dBA. Instantaneous C-weighted peak sound level limits also apply, but are not discussed here.

Employers are required to evaluate workplace noise levels and worker noise exposures to identify the persons and locations where the provisions of the directive apply.

Where daily personal exposure is likely to exceed 85 dBA, information and training relative to the risks of this exposure must be provided to workers and their representatives, and they must also be informed of the measures taken in accordance with the requirements of the directive. Additionally, hearing protectors must be made available.

If it is not practicable to reduce a worker's daily personal exposure level below 85 dBA, the worker "shall be able to have his hearing checked by a doctor."

If a worker's daily personal noise exposure exceeds 90 dBA, technical and/or organizational measures must be employed to reduce the exposure as much as practicable. Hearing protectors must be used, and workers and their representatives must be informed of the excess exposure

level and the measures taken to reduce it. Access to areas where this exposure could occur must be limited, and signs must be posted to define the area.

7.1.3 Council Directive 2003/10/EC

Council Directive 86/188/EEC was repealed with the publication of Council Directive 2003/10/EC in the Official Journal of the European Union on February 15, 2003. The Member States of the EU have until February 15, 2006 to implement their own laws or regulations needed to comply with it. Until a Member State has implemented this directive, Council Directive 86/188/EEC remains in force.

Council Directive 2003/10/EC specifies an 8-hour exposure limit value of 87 dBA, an upper exposure action value of 85 dBA, and a lower exposure action level of 80 dBA. These are 8-hour time-weighted average values. Instantaneous C-weighted peak sound level limits also apply, but are not discussed here.

Employers are required to assess and, if necessary, measure the sound levels to which workers are exposed.

The 8-hour exposure limit value, 87 dBA, is the absolute maximum level an individual can be exposed to. However, if an individual is exposed to a sound level high enough to result in an 8-hour exposure level greater than 87 dBA, hearing protection devices (HPs) can be used to reduce the 8-hour exposure level to 87 dBA. HPs cannot be used to reduce the 8-hour exposure level to the 8-hour upper action value of 85 dBA. Therefore, in an environment that would expose personnel not using HPs to an 8-hour exposure level above 87 dBA, personnel using HPs are deemed to be exposed to an 8-hour exposure level of 87 dBA, even though the use of HPs reduces the 8-hour exposure to a level well below 87 dBA. Consequently, "technical and/or organisational measures" must be employed to reduce the 8-hour exposure level from 87 dBA to 85 dBA.

If the exposure level equals or exceeds the upper exposure action value, HPs must be worn. If the exposure level exceeds the upper exposure action level, technical or organizational measures must be employed to reduce the exposure and the worker "shall have the right to have his/her hearing checked."

If a worker's exposure level exceeds the lower exposure action value, HPs must be made available and audiometric testing shall be made available to the individual, where a risk to health is indicated.

Workers whose exposure levels equal or exceed the lower exposure action value shall re-

ceive information and training relative to the risks of the exposure.

Weekly noise exposure levels may be used instead of daily noise exposure levels in some circumstances.

7.2 ACOUSTICAL TERMINOLOGY

Acoustical terms used in this document are defined in this section. Most of these definitions are described fully by Harris (1979) and ANSI S1.1-1994.

A-Weighted Sound Level. Weighted sound pressure level obtained by the use of metering characteristics and the A-weighting specified in American National Standard Sound Level Meters for Measurement of Noise and Other Sounds (ANSI S1.4-1983, 1997).

Day/Night Sound Level (Ldn). The 24-hour, time averaged, A-weighted sound level obtained by adding 10 dBA to the sound levels from 10 p.m. to 7 a.m.

Decibel. A unit of level denoting the ratio between two quantities that are proportional to power; the number of decibels corresponding to this ratio is 10 times the logarithm to the base 10 of this ratio.

Far Field. The part of the sound field in which the sound pressure level decreases by 6 dBA for each doubling of distance from the source.

Free Field. A field in a homogeneous, isotropic medium free from boundaries.

Near Field. The part of the sound field that lies between the noise source and the far field. In this region, the sound pressure level does **not** decrease by 6 dBA for each doubling of distance from the source.

Noise. Unwanted sound.

Octave Band. An interval between two sounds having a frequency ratio of two.

Octave Band Sound Pressure Level. The band pressure level in decibels for a frequency band corresponding to a specified octave.

Receiver. A person (or persons) or equipment affected by noise.

Sound. An oscillation in pressure in an elastic medium, which is capable of producing the sensation of hearing. Also, the sensation of hearing caused by a pressure oscillation.

Sound Intensity Level (Li). In decibels, 10 times the logarithm to the base 10 of a given intensity to a reference intensity. The reference intensity is 10^{-12} watt/in.²).

Sound Pressure Level (Lp). In decibels, 20 times the logarithm to the base 10 of the ratio of the pressure of the sound to a reference pressure. The reference pressure is 20 μ Pa (2×10^{-5} N/m²).

Sound Power Level (Lw). In decibels, 10 times the logarithm to the base 10 of the ratio of a given power to a reference power. The reference power is 10^{-12} watt.

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Solar Turbines

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SPNP/705/DP

Price Notes:

1. Louver adder provided in lieu of snow hood for snow protection of the bundle. Please add for aluminum, parallel acting manual louvers with manual handle at bottom of the stub column.
2. Please add for aluminum Durastroke 1100 actuator with positioner on the louvers.

Technical notes, Comments, and Exceptions:

A. 30" wide header walkway complete with 1 ladder to grade. Walkway is constructed from 1" serrated bar grating. All handrails, midrails, and posts are constructed from angle. All material is hot dip galvanized per ASTM A-123.

B. Atmospheric Gas Cooler Bid Specification

III. Louvers offered in lieu of snow hood. Please see Price Note 1.

IV. Physical noise test not included. Predicted noise levels guaranteed per Moore Fan rating sheet (included with proposal).

C. Minimum Requirements for Pressurized Welded Fabrications

4.1.3. All root passes welded as GMAW - short arc. All filler passes for all materials welded as FCAW and/or SAW.

4.3.9. Stress relieving per API-661.

D. El Paso Paint Specification AC-135 and El Paso Coating Specification SC-204 are not applicable to gas cooler.

E. Single fan design acceptable by API 661 if agreed upon by the customer.

AIR COOLED HEAT EXCHANGER SPECIFICATION SHEET

1					Date:	9/29/08 Rev. 5	
2	Customer	El Paso Pipeline Group			Item No.	AC-100	
3	Plant Location	Pelham, New Hampshire			Job No.	TGP 270B1	
4	Service	Atmospheric Gas Cooler			Ref. No.	13602	
5	Size and Type	Model: 1 H96-1-10 FORCED Draft			P.O. No.	RFQ	
6	Surface/Unit - Finned Tube	11000.2 ft2			No. Bays	1	
7	Heat Exchanged	3,302,340 Btu/h			Bare Tube	518 ft2	
8	Transfer Rate-Finned Tube	5,208 :Bare Tube, Service			MTD. Eff.	57.64 %F	
9					Clean	129,936 Btu/h.ft2.F	
PERFORMANCE DATA - TUBE SIDE							
10	Fluid Name	Natural Gas			Vapor Ref. Temp.	%F 120.0 / 132.6	
11	Total Fluid In	lb/h	440045	Specific Heat	Btu/lb.F	0.5952 / 0.5956	
12	Vapor	lb/h	440045	Viscosity	cP	0.01318 / 0.01344	
13	Liquid	lb/h	0	Conductivity	Btu/h.ft.F	0.02322 / 0.0239	
14	Noncond	lb/h		Molecular Weight		17.6 / 17.6	
15	Steam	lb/h		Liquid Ref. Temp.	%F	32.0 / 32.0	
16	Water	lb/h		Specific Heat	Btu/lb.F	0.0 / 0.0	
17	Fluid Cond./Vapzd.	lb/h	0	Viscosity	cP	0.0 / 0.0	
18	Temperature In/Out	%F	132.6 / 120.0	Conductivity	Btu/h.ft.F	0.0 / 0.0	
19	Pressure	psia	754.996	Density	lb/ft3	0.0 / 0.0	
20	Velocity In/Out	ft/s	71.18 / 70.13				
21	Press. Drop Allow/Calc	psi	5.0 / 3.933	Fouling resistance	h.ft2.F/Btu	0.0011	
PERFORMANCE DATA - AIR SIDE (Air)							
23	Air Quantity, Total	lb/h	277230	Altitude above Sea Level	ft	180	
24	Air Quantity/Fan	acfm	58553.09	Temperature In (Dry Bulb)	%F	40	
25	Actual Static Press	in H2O	0.498	Temperature Out	%F	89.41	
26	Face Velocity	sfm	640	Min. Design Ambient	%F	-10	
27	Max Mass Velocity	lb/h.ft2	6.179	Fan Air Temperature	%F	40	
DESIGN - MATERIALS - CONSTRUCTION							
29	Design Pressure	800.0	psig	Test Pressure	1200	psig	Design Temperature
30	TUBE BUNDLE				Design Temperature	250 +/-10 %F	
31	Size	9.637 x10.0		HEADER, Type	Plug Box	TUBE, Material	SA-214
32	No./Bay 1	No. Rows	4	Material	SA-516-70	Wld	
33	Arrangement				OD	1 Thick	0.083 in
34	Bundles	1 Parallel		No. Passes	1	Length	10 ft
35	Bays	1 Parallel		Slope	0	Pitch	2.313 in
36	MISCELLANEOUS				Plug Material	A-105	
37	Struct. Mount	Grade c/c		Gasket Material	CS	Fin, Type	TWF
38	Surf Prep	SSPC-2		Corrosion Allow.	.125 in	Material	Aluminum
39	Surf Finish	Galvanize		No. Size In Nozz.	2 - 12" 600# RF-WN	OD	2.25 Thk. 0.015 in
40	Hail Guards	None		No. Size Out Nozz.	2 - 12" 600# RF-WN	No./in	10
41	Louvers / Actuators	Auto Option		Vent and Drain	1" 6000#	Code -	ASME Stamp Yes
42	Vibration Switches	Murphy VS-2EX		TI	PI	X-RAY	API Spot PWHT Yes
MECHANICAL EQUIPMENT							
44	Fan Mfg	Moore		Header Prep	SSPC-SP-5	SPECS.	API-561 Yes
45	Model Class 10000	Series 30 EC VT		Header Finish	Metalize		
46	No./ Bay 1	Rev/Min 369					
47	Dia. ft 8	No. Blades 3		Driver		Speed Reducer	
48	Pitch 7.34	Manual		Type	Electric Motor	Type	HTD
49	Mat'l: Blade	AL	Hub AL	Mfg.	Siemens or Equal	Mfg.	Gates
50	hp/Fan, Design	8.38		No/Bay 1	Frame 215T	Model	8MGT-2200-12 8MX-180S-12
51	hp/Fan, Min Amb			hp /Driver	10	No/Bay 1	8MX-38S-12
52	Plot Area	10 x 9.73958	ft2	Rev/Min	1750	AGMA Rating, hp	1.8
53	Walkways	Width	Type	Enclosure	TEFC Ins F TR B	Ratio	4.743
54	Inlet			Volt:Phase/Cycle	460/3/60	Support	Structure
55	Outlet			Total Weight (per bay)	13310	Dry	Coll Vol 163 Gal
56	Drive			Recirculation		Wind Load	per specs
57	1. Motor space heater required.						
58	2. Design includes one header walkway and ladder.						
60							
61							
62							

Moore Fans LLC Rating

Phone: (660) 376-3575 www.moorefans.com Fax: (660) 376-2909

Version 2.02

9/3/2008 11:11

El Paso Pipeline Group		Ref No.:	TGP 270B1	Item No:	AC-100
Class:	10000	Hub Type:	HD	Blade Type:	EC
Blade Tip:	VE	Adjustment:	MAN	Rotation:	RH
Series:	30	Diameter:	8 feet	Blades:	3
Temperature:	40 Deg. F	Elevation:	180 feet	Density Ratio:	1.053
Volume:	281337 lb/Hour	Air Vel.:	1264.93 fpm	Speed:	369 RPM
Static Pressure:	0.499240548 in H2O	Pv:	0.105 in H2O	Pt:	0.636 in H2O
Power Req'd.:	8.38 bhp	Motor:	10 bhp	Total Eff:	71.0%
				Static Eff:	55.7%
Blades Required:	2.24	API Blds Req.:	3.00	Blade Load:	0.746
Tip Speed:	9284.1 fpm	Deflection Angle:	49.3 deg.	Pitch Number:	1.37
Entry Correction:	1.3	Tip Clearance:	0.5 inches	Design Angle:	7.3 deg
Exit Correction:	1	Draft:	FORCED		
Starting Torque:	2	Max Torque:	284 ft. lbs	Torq/Bld:	95 ft. lbs
Appr fan weight:	59 lbs		27 kg	Bore Size:	1.6875 inches
WR2	209 lb-ft2		8.8 kg m2	Bushing Type:	U
Thrust Load:	166 lbs		75 kg	Qty required:	1
Noise Levels Per Fan (Forced Draft)					
		Sound Power Level			
dBA	HZ	63	125	250	500 1000 2000 4000 8000
89.5		95.5	94.5	91.5	86.5 84.5 78.5 72.5 66.5
Sound Pressure Level 1 meter below fan					
77.8		83.8	82.8	79.8	74.8 72.8 66.8 60.8 54.8
Sound Pressure Level 1 meter from blade tip					
72.2		78.2	77.2	74.2	69.2 67.2 61.2 55.2 49.2
Fan Selected					
Class 10000, Series 30, 8 feet Diameter, 3 Blades					
Manual Adustment, Heavy Duty, Extended Chord, Right Hand Rotation					

Moore Fans LLC

Phone: (660) 376-3575

www.moorefans.com

Fax: (660) 376-2909

El Paso Pipeline Group

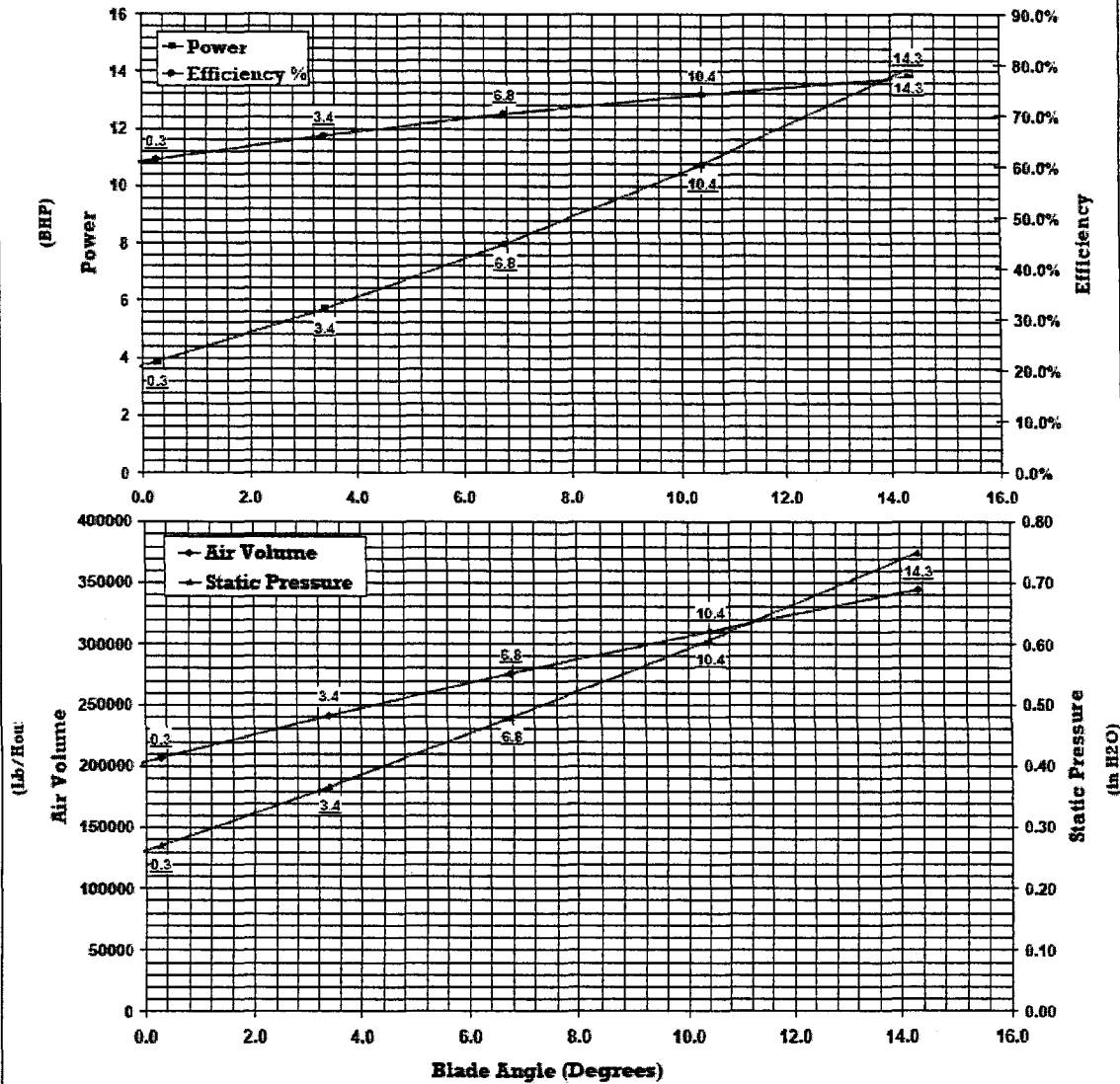
Reference No.

TGP 270B1

Item No.

AC-100

System Performance Curve



Design Angle= 7.3

Design Conditions					
Class:	10000	Blade Type:	EC	Temperature:	40 Deg. F
Series:	30	Blade Tip:	VE	Elevation:	180 feet
Diameter:	8.00 feet	Adjustment:	MAN	Density Ratio:	1.053
RPM:	369	Blades:	3	Air Volume:	281337.00 Lb/Hour
				Static Pr.:	0.49924 in H2O
				Power Req'd:	8.38 bhp
				Design Angle:	7.3 deg
				Weight:	59 lbs

**TOWN OF WINDHAM
ZONING ORDINANCE
AND
LAND USE REGULATIONS**

Adopted **March 9, 1954**
Amended **March 8, 1955**
Amended **March 12, 1957**
Amended **March 10, 1959**
Amended **Sept. 18, 1959**
Amended **March 9, 1960**
Amended **March 14, 1962**
Amended **March 13, 1963**
Amended **March 10, 1964**
Adopted **May 23, 1967**
Amended **March 12, 1969**
Amended **March 11, 1970**
Amended **March 12, 1971**
Amended **January 9, 1973**
Amended **June 27, 1974**
Amended **March 2, 1976**
Amended **March 14, 1978**
Amended **March 16, 1979**
Amended **March 11, 1980**
Amended **March 14, 1981**
Amended **March 12, 1982**
Amended **March 8, 1983**
Amended **March 13, 1984**

Amended **March 12, 1985**
Amended **March 11, 1986**
Amended **March 13, 1987**
Amended **March 8, 1988**
Amended **March 14, 1989**
Amended **March 13, 1990**
Amended **March 10, 1992**
Amended **March 9, 1993**
Amended **March 8, 1994**
Amended **March 14, 1995**
Amended **March 11, 1996**
Amended **March 11, 1997**
Amended **March 10, 1998**
Amended **March 9, 1999**
Amended **March 14, 2000**
Amended **March 13, 2001**
Amended **March 12, 2002**
Amended **March 11, 2003**
Amended **March 9, 2004**
Amended **March 8, 2005**
Amended **March 14, 2006**
Amended **March 13, 2007**
Amended **March 11, 2008**

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LAND USE REGULATIONS AND ZONING ORDINANCE
FOR THE TOWN OF WINDHAM, NEW HAMPSHIRE

SECTION 100 - PURPOSES

The purposes of this Zoning Ordinance are to lessen congestion in the streets, to secure safety from fires, panic and other dangers; to promote health and general welfare; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue concentration of population; to facilitate the adequate provision of transportation, water, sewage, schools, parks, and other public requirements; to conserve the value of buildings and to encourage the most appropriate use of land in accord with Chapter 31:60-89, New Hampshire Revised Statutes Annotated, 1955, and any amendments thereto.

SECTION 200 - DEFINITIONS

For the purpose of this Ordinance, certain terms and words are herein defined as follows: Words used in the present tense include the future; words in the singular number include the plural number, and words in the plural number include the singular number; the word "shall" is mandatory and not directory; the word "building" includes the word "structure," the word "lot" includes the word "plot," and the word "land" includes the words "marsh" and "water." Unless defined otherwise, for the purposes of this Ordinance, the definition of the Building Code of the Town of Windham governs.

Accessory Building or Use: A use, or detached building which is subordinate to the main use or building and located on the same lot with the main building or use, the use of which is customarily incidental to that of the main building or to the use of the land. Where a substantial part of a wall of an accessory building is a part of the wall of a main building, or where an accessory building is attached to the main building, such accessory building shall be counted as a part of the main building.

Awning: An awning is an architectural projection that provides weather protection, identity or decoration and is wholly supported by the building to which it is attached. An awning is comprised of a lightweight, rigid skeleton structure over which a covering is attached.

Boarding or Rooming House: A building or premises, other than a hotel, inn, motel, tourist court or lodging house, where rooms are let and where meals may be regularly served by pre-arrangement for compensation; not open to transient guests; in contradistinction to hotels, restaurants and tourist homes, open to transients.

Building: As defined by the Building Code, Town of Windham.

Building Inspector: The Building Inspector shall mean the Inspector of buildings or other designated authority, or his duly authorized representative and charged with the enforcement of the building code.

Building Lot: A measured parcel of land having fixed boundaries, with the required frontage on a town-approved road and conforming to Town Zoning and/or Subdivision Control Regulations.

Canopy: A canopy is an architectural projection that provides weather protection, identity or decoration and is supported by the building to which it is attached at the outer end by not less than two stanchions. A canopy can also be a detached structure and is comprised of a rigid structure over which a rigid covering is attached.

Change in Use of Structure: An extension, enlargement, and/or alteration of pattern of utilization of the structure or change in purpose for which the structure is used and which increases the total intensity use of the structure which results in one (1) of the following (i) a change in the nature and purpose of the prior use, (ii) constitutes a use different in character, nature or kind, (iii) results in a substantially different effect on the surrounding neighborhood.

Completed Application: One that contains sufficient information to allow the Board to proceed with consideration and to make an informed decision.

Conversion: A structural change to adopt or alter a seasonal residence for year-round residential use; or a change in use, such as a change from seasonal occupancy to year-round occupancy.

Customary Home Occupation: An occupation for gain or support conducted primarily on the premises by the members of a family residing on said property, including and similar to dressmaking, preserving, home cooking, engineering, surveying, craft manufacturing, selling and collecting antiques.

Dwelling: Single-Family: A building or manufactured housing as defined in RSA 674:31, occupied exclusively for residence purposes only and having one dwelling unit, but not including commercial accommodation for transient occupancy.

Dwelling: Multi-Family: A building or portion thereof containing two or more dwelling units occupied exclusively for residence purposes, but not including trailers or mobile homes, however mounted, or commercial accommodations for transient occupancy.

Dwelling Unit: Rooms arranged for the use of one or more individuals living together as a single housekeeping unit with cooking, living, sleeping, and sanitary facilities.

Floor Area: The interior floor area of a dwelling unit exclusive of basements, stairwells, attics, and attached accessory buildings.

Garage, Private: Covered spaces for the housing of motor vehicles, but not for the commercial repair, storage, or rental of motor vehicles.

Grade Plane: A reference plane representing the average of finished ground level adjoining the building at all exterior walls. When the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, when the lot line is more than 6 feet from the building, between the building and a point 6 feet from the building.

Height, Building: The vertical distance from grade plane to the height of eight (8) feet above the highest occupiable floor surface.

Hotel, Inn, Motel, Tourist Court or Lodging House: A building, or portion thereof, or a group of buildings, on a single lot, intended to be used for the more or less temporary occupancy of more than five (5) individuals who are lodged, with or without meals, and in which major provision for cooking may be made in a central kitchen.

Kennel, Coop, or Pen: Accessory building or enclosure for keeping domestic pets, animals, or birds for use or pleasure of residents, limited to litters and three or less such pets or animals three months or older in age, and to two dozen birds.

Loading Space, Off-Street: An off-street space or berth, on the same lot with a building, for the temporary parking of vehicles while loading or unloading merchandise or material, and which has access to a street, alley, or other appropriate means of ingress and egress.

Lot: A measured parcel of land having fixed boundaries.

Lot, Corner: A lot abutting on two or more streets at their intersections.

Manufactured Housing: Means any structure, transportable in one or more sections, which, in the traveling mode, is 8 body feet or more in width and 40 body feet or more in length, or when erected on site, is 320 square feet or more, and which is built on a permanent chassis and designed to be used as a dwelling with or without a permanent foundation when connected to required utilities, which include plumbing, heating, and electrical heating systems contained therein. Manufactured housing as defined in this section shall not include presite built housing as defined herein.

Membership Club: A private organization, building, or grounds to include specifically country clubs and fraternities and other organizations to which membership is limited or controlled.

Non-Conforming Use: A non-conforming use of land or building is an existing use of land or building which does not conform to the regulations for the district in which such use of land or building exists and which existed at the time of publication of notice of the hearing before the Planning Board respecting the regulation to which it does not conform.

Occupiable Space: A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes, or in which occupants are engaged at labor; and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.

Overnight Parking: The parking or placement of a motor vehicle, except in emergency situation, between the hours of 10:00 P.M. to 6:00 A.M., or otherwise for six (6) or more consecutive hours during that period.

Permit: Written warrant or license granted by one having authority.

Piggeries and Mink Farms: Four or more animals.

Presite Built Housing: Means any structure designed primarily for residential occupancy which is wholly or in substantial part made, fabricated, formed or assembled in off-site manufacturing facilities in conformance with the United States Department of Housing and Development minimum property standards and local building codes, for installation, or assembled and installation, on the building site. For the purposes of this definition, presite built housing shall not include manufactured housing, as defined herein.

Private Way: Discontinued road or road not accepted by the Town.

Professional Occupation: Any recognized profession, including the office of a doctor, lawyer, or dentist.

Public Utility: A corporation, company, association, joint stock association, partnership or person, including governmental agencies, which are regulated by the Public Utilities Commission, or franchised by the state or local government, and owning, operation, or managing any plant, or equipment involved in the supplying of services through erection, construction, alteration, or maintenance of gas, electrical service, water, or waste water transmission, distribution or collection systems; the conveyance of communication, telephone, telegraphic or television messages or services including cable TV."

Seasonal Residence: A home, apartment, tenement, dwelling unit or other premises which were originally or are currently, (i) designed, (ii) situated or (iii) constructed, to be occupied primarily in the summer months; or such premises which were not or are not intended to be used by the inhabitants as a primary or permanent residence. For the purposes of this definition, as well as Section 1200., any dwelling unit used and occupied as a year-round residence on March 8, 1988 and not abandoned thereafter shall be considered a year-round residence.

Sign: Any words, lettering, parts of letters, figures, numerals, phrases, sentences, emblems, devices, designs, trade names, or trade marks by which anything is made known, such as are used to designate an individual, a firm, an association, a corporation, a profession, a business, or a commodity or product, which are visible from a public street or right-of-way and used to attract attention.

Street: A public way shown on a plan approved in accordance with the subdivision control law or otherwise qualifying a lot for frontage on a street under the subdivision control law.

Street Line: The dividing line between a street and a lot and, in the case of a public way, the street line established by the public authority laying out the way upon which the lot abuts.

Structure: As defined by the Town of Windham adopted building code.

Structure, Antenna: The rigid portion of the assembly which receives or transmits radio energy, and the mast or tower upon which said assembly is mounted, excluding non-rigid items such as wire, cable, transmission lines, guy wires or guy wire anchors.

Town: The Town of Windham, New Hampshire

Tourist Camp or Camp Sites: Land used or intended to be used, let or rented for occupancy by campers traveling by automobile or otherwise; or for occupancy by house trailers, tents, or movable or temporary dwellings, rooms or sleeping quarters of any kind.

Wetland And Water Shed Protection District (W.W.P.D.): See Section 601.2.2.

Wetlands: An area that is inundated or saturated by surface water or groundwater at a frequency and duration to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are to be delineated in accordance with the criteria and methods outlined in the Army Corp of Engineers, January 1987 Wetlands Delineation Manual. The Hydric Soils component of delineations shall be determined in accordance with the Manual "Field Indicators for Identifying Hydric Soils in New

England." (Version 2, July 1998, Published by the New England Interstate Water Pollution Control Commission)

Yard: An open space, other than an enclosed court, on the same lot with a building or group of buildings, which open space lies between the building or group of buildings and a lot line, and is unoccupied and unobstructed from the ground upward.

Yard, Front: An open, unoccupied space extending across the full width of the lot and lying between the front lot line of the lot and the nearest line of the building. The depth of a front yard shall be the minimum distance between the building and front lot line.

Yard, Rear: An open, unoccupied space extending across the full width of the lot and lying between the rear lot line of the lot and the nearest line of the building. The depth of a rear yard shall be the minimum distance between the building and rear lot line.

Yard, Side: An open, unoccupied space between the side lot line of the lot and the nearest line of the building and extending from the front yard to the rear yard or, in the absence of either of such yards, to the front or rear lot lines, as may be. The width of a side yard shall be the minimum distance between the building and the side lot line.

SECTION 300 - DISTRICTS

301. Establishment of Districts: For the purposes of this Ordinance, the Town of Windham is divided into the following types of districts:

- 301.1 Wetland and Watershed Protection District
- 301.2 Rural District
- 301.3 Residence District A, B, and C
- 301.4 Neighborhood Business District
- 301.5 Business Commercial District A and B
- 301.6 Gateway Commercial District
- 301.7 Limited Industrial District
- 301.8 Historic District
- 301.9 Flood Plain District
- 301.10 Aquifer Protection District
- 301.11 Village Center District
- 301.12 Open Space Residential Overlay District
- 301.13 Professional, Business & Technology District
- 301.14 Housing for Older Persons Overlay District
- 301.15 Route 28 Access Management Overlay District

302. Location of Districts: Said Districts are hereby established as shown, located, defined and bounded on the latest approved map entitled, "Zoning District Map of the Town of Windham, New Hampshire" signed by the Planning Board and filed with the office of the Town Clerk; with the exception of the Wetland and Watershed Protection District, the Flood Plain District, the Aquifer Protection District, the Housing for Older Persons District, the Open Space Residential Overlay District and the Route 28 Access Management Overlay District, which are not defined by boundary lines on said map, but are districts determined by criteria set up under Sections 601, 607, 609, 610, 611 and 615 respectively; which map, together with all explanatory matter thereon, is hereby incorporated in and made part of this Ordinance.

303. Location of Boundaries of Districts:

303.1 Where the boundary lines are shown upon said map within the street lines of public and private ways or utility transmission lines, the center lines of such ways or lines shall be the boundary lines, unless otherwise indicated.

303.2 Boundary lines located outside of such street lines or transmission lines and shown approximately parallel thereto, shall be regarded as parallel to such lines, and dimensions shown in figures placed upon said map between such boundary lines and such transmission lines are the distances in feet of such boundary lines from the center line of such lines, such distances being measured at right angles to such lines unless otherwise indicated.

303.3 Where the boundary lines are shown approximately on the location of

property or lot lines and the exact location of property, lot or boundary lines is not indicated by means of dimensions shown in figures, then the property or lot lines shall be the boundary lines.

303.4 Contour lines used as boundary lines are the elevation above the datum mean sea level as indicated by the U.S. Geological Survey.

303.5 Soil Association lines used as boundary lines are the Soil Association boundary lines as shown on the Soil Association Map, prepared by the U.S. Soil Conservation Service, dated 1966, and on file with the Planning Board.

303.6 In all cases which are not covered by other provisions of this Section, the location of boundary lines shall be determined by the distance in feet, if given, from other lines upon said map, by the use of identifications as shown on the map or by the scale of said map.

303.7 For lots located in more than one district, uses and structures shall conform to the requirements of the district in which they are located. If the use or structure spans the boundary between districts, the provision which imposes the greater restriction or higher standard shall apply.

SECTION 400 - CONTINUANCE OF EXISTING USES:

A non-conforming use may continue provided that:

401. No increase in the extent of the non-conforming use of a structure or land, shall be made, except when a variance has been granted by the Board of Adjustment as provided in Section 900 or as allowed in Section 406.

402. If said non-conforming use has been changed to a more restricted use, it shall not again be changed to a less restricted use, and any future use shall be in conformance with this ordinance.

403. If the non-conforming use is discontinued for a period of more than one (1) year or is abandoned, it shall not be reestablished.

404. A non-conforming building destroyed or damaged by fire, explosion or other catastrophe may be rebuilt or restored at the same location and again used as previously, provided that said owner shall apply for a building permit and start operations for restoring or rebuilding on said premises within twelve (12) months after such catastrophe and reconstruction is completed and occupancy begun within two (2) years of start of restoration unless a permit for a longer period of time has been granted by the Board of Adjustment, and further provided that the building as restored shall be constructed in accord with the Building Code of the Town of Windham and shall be only as great in volume or area as the original non-conforming use, unless permission to enlarge the volume is granted by the Board of Adjustment as provided in Section 900.

405. Replacement of a pre-existing non-conforming structure shall be permitted under the following conditions:

405.1. The septic system must have State and Town approval.

405.2. There will be no increase in the area and/or volume of the structure.

405.3. There will be no increase in the non-conformity of the structure.

405.4. The new structure shall conform to the requirements of the Building Code.

405.5. A replacement of a non-conforming structure shall whenever possible be made to conform to the required setback requirements.

406. A non-conforming structure which is a non-conforming use based on the fact that the lot size does not conform to the existing lot size requirements may be expanded, subject to the following requirements:

406.1. The required septic system for such expanded use shall have State and Town approval without waivers from Env.WS 1004.16 of the NHDES Sewage Disposal System Design Rules.

406.2. The increase in volume or footprint does not result in the increase in volume of any portion of the structure which does not conform to other applicable setbacks.

406.3. The new structure shall conform to the requirements of the adopted building code.

406.4. In no case shall the building occupy more than allowed in Appendix A-1 Table of Requirements. Maximum % building covered for the relevant zoning district.

SECTION 500 - NEW CONSTRUCTION AND NEW USES

501. For the purposes of this Ordinance, any lawful building or structure or use of a building, structure or land or part thereof, may be constructed, altered, enlarged, repaired or moved, occupied and used for any purpose which does not violate any section of this Ordinance or any of the provisions of the ordinances of the Town of Windham.

502. Any construction or use for which a building permit was legally issued prior to the publication of notice of the Planning Board hearing respecting this Ordinance or any amendment thereto shall be permitted, notwithstanding non-compliance with the requirements of this Ordinance or amendments thereto, provided such construction or use was commenced within six (6) months after the issuance of the permit and in the case of construction, completed within two (2) years thereafter.

503. A change of use or expansion of any non-residential or multi-family building, land or structure shall require Site Plan approval except when the size of the building does not change and the new use is a permitted use in the zone, the new use is of the same type as the prior (e.g. Change in type of retail store, change from apartment to condominium), and the new use does not demand any additional requirements of the lot beyond previous use.

SECTION 600 - USE REGULATION

601. Wetland and Watershed Protection District:

601.1 Purpose: In the interest of preserving water resources of the Town for the benefit of public health, safety, welfare and convenience, the regulations of the Wetland and Watershed Protection District are intended to guide the use of wetlands, lands draining into wetlands, as well as brooks, ponds, and water supply areas in order to:

601.1.1 Prevent the development of structures, or other land uses within the W.W.P.D. that would contribute to surface and groundwater contamination or reduce surface and groundwater supplies;

601.1.2 Preserve wetland areas which provide flood protection, nutrient absorption and augmentation of stream flow during dry periods;

601.1.3 Prevent unnecessary or excessive expense to the Town in providing and maintaining essential services and utilities, such as sewage collection and treatment and public water supply, which may arise because of the inappropriate use of land within the W.W.P.D.;

601.1.4 Encourage those uses that can be appropriately and safely located within the W.W.P.D.

601.1.5 To enhance and protect surface and ground water quality.

601.2 Definitions:

Wetlands: An area that is inundated or saturated by surface water or groundwater at a frequency and duration to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are to be delineated in accordance with the criteria and methods outlined in the Army Corp of Engineers, January 1987 Wetlands Delineation Manual. The Hydric Soils component of delineations shall be determined in accordance with the Manual "Field Indicators for Identifying Hydric Soils in New England." (Version 2, July 1998, Published by the New England Interstate Water Pollution Control Commission)

Wetland and Watershed Protection District (W.W.P.D.): Land areas designated as a W.W.P.D. shall include all areas in Section 601.4 and include wetlands one (1) acre in size or larger, as well as brooks, streams and ponds. For wetlands less than one (1) acre in size, see Section 601.4.3 and Section 601.4.7

Normal High Water Mark: Normal High Water Mark means the line on the shore, running parallel to a brook, stream or pond, established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the immediate bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. Where the normal high water mark is not easily discernible, the normal high water mark may be determined by the Department of Environmental Services.

Brook or Stream: A brook or stream is a scoured natural or artificial channel indicating periods of concentrated water flow that has a contributory drainage area of 10 acres or more containing a wetland as defined in Section 601.2 -

Wetlands of this ordinance. Roads, drainage culverts, or other man-made features do not constitute an interruption in the delineation of a brook or stream.

Methodology for determining the upper limits of the WWPD around a brook or stream as defined in Section 601.2 Brook or Stream.- the Town of Windham Zoning Ordinance and Land Use Regulations: *Editors note: (See Figure 1)*

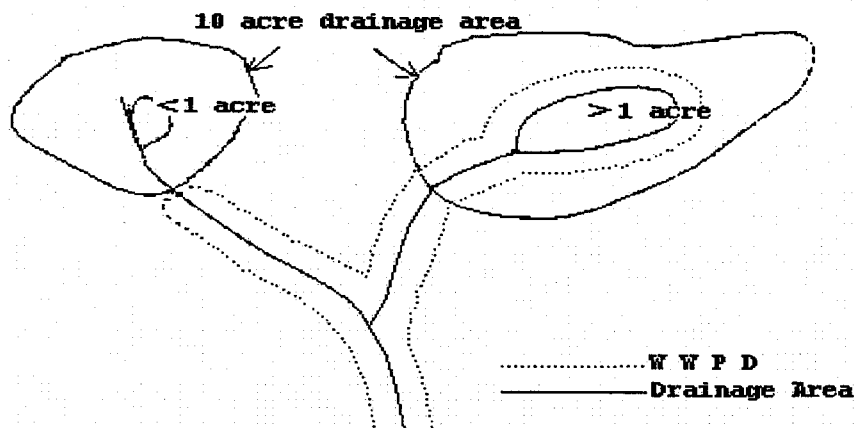


Figure 1

Method: Trace the channel upstream to the point where the contributory drainage area to the channel equals 10 acres. If there are no wetlands or ponds in this ten acres, the WWPD ends here. If there are wetlands or ponds in this ten acres, but they are less than one acre in size, the WWPD ends here. If the wetlands or ponds are greater than one acre in size, the WWPD extends along the channel and includes the wetlands and ponds.

Pond: Any year round standing body of water one (1) acre or more in area.

Hydric Soils: Soils that are saturated or flooded during a sufficient portion of the growing season to develop anaerobic conditions in the upper soil layers.

Watershed: A geographical area in which all water drains to a given stream, lake, wetland, estuary or pond. Within every watershed, water runs to the lowest point on that landscape - a stream, lake, wetland, estuary or pond. (NH DES).

601.3 Uses Permitted: Any of the following uses that do not result in the erection of any permanent building or conflict with the intents and purposes in Section 601.1 may be permitted in this district subject to Section 601.4.8:

601.3.1 Forestry, tree farming;

601.3.2 Agriculture, including grazing, farming, truck gardening and harvesting of crops; except that mink farms and piggeries shall not be included in this District;

6.1.3.3 Water impoundment's and well supplies;

601.3.4 Drainage ways, streams, creeks or other paths of normal run-off water;

601.3.5 Wildlife refuge;

601.3.6 Open space as may be permitted by Subdivision Regulations and other sections of this Ordinance;

601.3.7 Recreation, pedestrian trails, parks (but not an amusement park), fishing, boat landings, picnic areas, and any noncommercial open-air recreational use, provided that there are adequate provisions for disposal of waste products and for parking outside the W.W.P.D.

601.3.8 Driveway, streets and roads (hereinafter access ways) subject to the following:

The only buildable uplands available on the lot have no reasonable alternative means of access from any road, whether publicly or privately owned; and

The access way crossing is designed to minimize to the greatest extent possible any disruption of the W.W.P.D.; and

The length and design of the access way is the minimum length and width necessary to provide access to the proposed use through the W.W.P.D.

601.3.9 Utility systems, including water, gas, sewer, electricity, telephone, cable and communication lines.

601.4 Regulations:

601.4.1 Wetlands and Watershed Protection Districts shall include all lands within one hundred and fifty feet (150') of the normal high water mark of Beaver Brook, Golden Brook and Flat Rock Brook. The W.W.P.D. for any other brook, stream or pond shall include all land within one hundred feet (100') of the normal high water mark of said Brook or stream and one hundred feet (100') from the normal high water of said pond.

601.4.2 The W.W.P.D. shall include that land area within one hundred feet (100') of any wetland one (1) acre in size or larger.

601.4.3 Wetlands of less than one (1) acre in size shall not be considered to have a W.W.P.D. except those which are contiguous to a stream, brook, or pond.

601.4.4 Notwithstanding the other provision herein, the following bodies of water shall not have a WWPD extending from their normal high water mark, nor shall they be considered a "pond" to adjacent wetlands: Cobbett's Pond, Canobie Lake, Shadow Lake, Rock Pond and Moeckel Pond. The WWPD associated with a stream or brook entering any of the exempt water bodies shall continue up to the normal high water mark of these water bodies.

601.4.5 The W.W.P.D. shall be increased by 100 feet under the following conditions: When that 100 feet has an upward slope of 12% or more and a minimum width of 100 feet.

601.4.6 No waste disposal system may be located closer than one hundred feet (100') to any wetland contiguous to any W.W.P.D. No waste disposal system may be located within any W.W.P.D.

601.4.7 Streams and brooks shall be considered to be part of any wetland through which said stream or brook flows. Any wetland contiguous to the stream or brook shall be protected by a W.W.P.D.

601.4.8 The following uses, which require excavation, filling, drainage, stump removal, or otherwise altering the surface configuration of the land that is necessary for any construction shall require a special permit from the Planning Board:

Uses permitted in the W.W.P.D;

Uses granted by variance;

If essential for the allowed use of land adjacent to the W.W.P.D.

Such approval may be granted after the submission of plans describing the activities and after proper public notice and public hearing. Such plans shall also be submitted to the Conservation Commission and Code Enforcement Administrator (CEA) for their review and comment at the public hearing. The Planning Board's action on proposals shall be based on whether the proposed action is consistent with the intents and purposes of Section 601 of this ordinance and documented accordingly. The following statement must be entered on the plan.

601.4.8.1 NOTE: No structure may be erected nor shall any alteration of the surface configuration of the land be permitted in the Wetland and Watershed Protection District, except as authorized by this approval.

601.4.8.2. Where any activity requiring Planning Board approval is proposed within the WWPD, the plan shall also indicate: the location and limits of the proposed activity; the construction techniques and sequence to be used in constructing the proposed improvements; and the protective measures to be employed to minimize the disturbance and/or degradation of the WWPD.

601.4.8.3. Where any activity requiring Planning Board approval is proposed within the WWPD, the applicant shall also submit evidence that: the WWPD disturbance is the minimum necessary to affect the proposed improvements; the proposed activity will not contribute to the degradation of surface or groundwater quality; the proposed activity is appropriate and safe to locate in the WWPD; and, the proposal is consistent with the intent and purpose of Section 601 of the Windham Zoning Ordinance. At a minimum, the Applicant shall submit:

- a) Plans showing profiles, cross-sections, and elevations at 50-foot maximum intervals, for any proposed street, drives, access ways, or other disturbance of the WWPD;
- b) Two (2) sets of color photographs (of minimum 4" x 6" size) taken in both directions along the centerline of any proposed street or access way at intervals corresponding with the intervals delineated on the plans submitted in accordance with 601.4.8.3.a.

601.4.9 Non-accessory building and structures closer than fifty (50) feet to the W.W.P.D. shall require review by planning staff. Planning Board review shall only be required at the applicant's request. The purpose of this section is to allocate room for swimming pools, decks, sheds, and lawn areas to be constructed outside of the W.W.P.D.

601.5 Test Procedures: Plant and soil surveys needed to determine the extent and location of a W.W.P.D. shall be subject to the review and approval of the Planning Board in consultation with the Conservation Commission. Such surveys as are required shall be conducted by a soil scientist, botanist, or other person qualified to determine soil conditions and identify wetland plant species and shall be completed at the expense of landowner/developer. A complete report of the survey(s) shall be filed with the Planning Board.

602. Rural District: The Rural District is intended as a district for rural, residential, and noncommercial uses.

602.1 Uses Permitted:

602.1.1.1 Uses permitted in the Wetland and Watershed Protection District, Paragraph 601.3:

602.1.1.1 Forestry, tree farming;

602.1.1.2 Agriculture, including grazing, farming, truck gardening and harvesting of crops; except that mink farms and piggeries shall not be included in this district;

602.1.1.3 Water impoundment's and well supplies;

602.1.1.4 Drainage ways, streams, creeks or other paths of normal run-off water;

602.1.1.5 Wildlife refuge;

602.1.1.6 Open space as may be permitted by Subdivision Regulations and other sections of this Ordinance;

602.1.1.7 Overnight parking as permitted in Section 603.1.5.

602.1.2 One (1) single-family detached dwelling per lot.

602.1.3 Boarding houses or rooming houses for not more than four (4) persons, provided that the house is also occupied as a private residence.

602.1.4 Fields, pasture, woodlots, greenhouses, and farms.

602.1.5 Kennels for pets and animals for use of the residents of the premises.

602.1.6 A customary home occupation shall be permitted by Special Exception only, (property owner must apply to the Zoning Board of Adjustment for a Special Exception). A Customary Home Occupation shall be carried on by the occupant only within the dwelling for dwelling purpose and shall not change the residential character thereof. No exterior renovations or construction, nor the public display of goods or wares or the exterior storage of material will be permitted and the Customary Home Occupation shall not occupy more than twenty-five (25%) of the normal living area of the dwelling. Only members of the occupant's immediate family residing on the property may be employed, except upon request, the Zoning Board of Adjustment is authorized to permit the employment of one (1) additional employee. In considering a Special Exception for a Customary Home Occupation, the Zoning Board of Adjustment shall consider, in addition to the requirements set forth above, whether the proposed Customary Home

Occupation will adversely affect the property involved, or neighboring properties, by reason of any unusual sight, light, noise, smell, traffic or other effects of the Customary Home Occupation. The Zoning Board of Adjustment shall consider the recommendation of the Code Enforcement Administrator as to the adequacy of the water supply, sewage disposal system, driveway entrances and off street parking for the anticipated use, although no parking area in excess of those necessary for normal residential purposes will be allowed. The Zoning Board of Adjustment shall impose such conditions and restrictions as it deems desirable or necessary to protect the residential character of the neighborhood.

602.1.6.1 Use of a room in a dwelling as an office is an allowed use without a Special Exception, provided that the use will not generate any traffic, i.e. deliveries or pickup of any supplies or materials or clients coming to the property.

In all cases where a Special Exception for a Home Occupation is granted, the person receiving the Special Exception shall complete and sign a form with the Code Enforcement Administrator that sets forth the nature of the Home Occupation and provides details of the business and its scope of operations. The applicant shall comply with the conditions set forth in the granting of Special Exceptions and the failure to comply will result in the revocation of the Special Exception.

602.1.6.2 Child Care Facilities as Home Occupations: The following categories and criteria shall be applied to all requests for Child Care as a Home Occupation:

602.1.6.2.1 Family Day Care: Care of three (3) to six (6) children from one (1) or more unrelated families including children under six (6) years old who live in the home and others related to the applicant. In addition to the six (6) children, one (1) to three (3) children attending a full day school program may also be cared for up on five (5) hours per day on school days and all day during school holidays. Thirty-five (35) square feet of space must be allocated per child and the total must comply with the twenty-five percent (25%) rule to qualify as a Home Occupation.

602.1.6.2.2 Family Group Day Care: Care of seven (7) to twelve (12) children from one (1) or more unrelated families including children under six (6) years old who live in the home and others related to the applicant. Thirty-five (35) square feet of space must be allocate per child and the total must comply with the twenty-five percent (25%) rule to qualify as a Home Occupation.

602.1.6.2.3 Day Care Nursery: Care of five (5) or more children under three (3) years of age. To qualify as a Home Occupation, a maximum of twelve (12) children will be allowed.

GROUP CHILD CARE CENTERS DO NOT QUALIFY AS HOME OCCUPATIONS

Note: Guidelines taken from NH Child Care Facility (Day Care) Licensing and Operating Standards under RSA 170-E:3.

602.1.6.3 Prohibited Home Occupation Uses Include but are not limited to:

Medical, Dental, Chiropractor, Veterinary and Real Estate Agent office.

602.1.7 Accessory buildings and use.

602.1.8 For lots of less than two (2) acres in the Rural Zone, the keeping of horses, sheep, cows, chickens, goats, and other farmyard animals shall be allowed only with a Special Exception from the Board of Adjustment. The Board of Adjustment shall grant a Special Exception under the following conditions:

602.1.8.1 There will be no diminution of surrounding property values.

602.1.8.2 The Health Officer certifies that the proposed use would not constitute a health hazard.

602.1.8.3 The Special Exception shall state the type of animal and the maximum number allowed.

602.1.8.4 The Board determines that there is sufficient acreage and/or suitable terrain for the proposed use.

602.1.9 Accessory Apartments:

602.1.9.1 Purpose:

To increase housing alternatives while maintaining neighborhood aesthetics and quality. One accessory apartment within a detached single-family dwelling shall be permitted, provided the following conditions are met:

602.1.9.2 Definitions:

Accessory Apartment: A dwelling unit, which contains all the amenities of a single family dwelling unit and that is either attached (by way of a common wall) or contained wholly within the principle single family dwelling or a combination of both.

Property Owner: For purposes of this subsection, a property owner is one or more natural persons who have current possessory fee ownership in the land and buildings situated thereon which constitutes the lot and the primary and accessory dwelling.

Common Wall: The wall that separates the living space of the primary dwelling unit from the living space of the accessory apartment.

602.1.9.3 Rules & Regulations:

602.1.9.3.1 Maximum of one (1) accessory apartment per property.

602.1.9.3.2 The property owner must occupy one of the two units.

602.1.9.3.3 The property and use must conform to all of the Town of Windham Zoning Ordinance and Land Use Regulations.

602.1.9.3.4 The exterior entrances of the dwelling shall be designed such that it has the characteristics and appearance of a single family residence. The driveway shall be designed so as to appear as a driveway of a single family residence.

602.1.9.3.5 Only one (1) bedroom is permitted in the accessory apartment and to qualify as an accessory apartment under this section, the apartment may not exceed 750 square feet of the floor space.

602.1.9.3.6 In the event the owner vacates the premises, the vacated unit will remain empty, until the owners return or new owners occupy one of the dwelling units (as required in Section 602.1.9.3.2)

602.1.9.3.7 In the event of a mortgage foreclosure sale, or other judicial sale which results in ownership by a corporation or other person or entity other than an occupant, the Building Dept. may request that the new property owner submit a statement acknowledging the effect of this ordinance, and a plan for compliance. The plan shall provide that either (i) an owner occupant commence residency, or (ii) one unit be vacated, either to occur within six (6) months of the foreclosure or other sale date.

602.1.9.3.8 If the accessory apartment is attached to a common wall, the wall must have an area that is at least 75% common to both units.

602.1.9.3.9 Where municipal sewer service is not provided, the septic system shall meet NH Water Supply & Pollution Control Division requirements for the combined use.

602.1.9.3.10 Off-street parking shall be provided for at least for (4) vehicles.

602.1.9.3.11 The structure and lot shall not be converted to a condominium or any other form of legal ownership distinct from the ownership of the existing single family residence. In order to assure compliance with this requirement, the property owners at the time the accessory apartment is established shall be required to execute a restrictive covenant, easement or development restriction deed running in favor of the Town, which shall be recorded in the Rockingham County Registry of Deeds.

602.1.9.3.12 An accessory apartment shall not be permitted on property where more than one dwelling unit currently exists, by variance or prior non-conforming use, or on property used as a family day care center.

602.1.9.3.13 Accessory apartments shall not be permitted in conjunction with variances from any requirements of Section 700 of this ordinance.

602.1.9.3.14 Variances from this section shall be contrary to the spirit and intent of the ordinance.

602.2 Uses Permitted Upon Site Plan Application and Review as Provided in Windham Site Plan Regulations:

Where at the time of development the site is abutting a residentially developed area, no structure or parking lot which requires a site plan review shall be permitted within 100 feet of the side and/or rear property line that abuts the residentially developed area. This area shall be used as a buffer zone and shall provide adequate screening to the adjoining lots.

602.2.1 Public and parochial schools, museums, playgrounds, churches, or parish houses.

602.2.2 Private schools, including schools of dance and music, nursery schools and colleges with or without dormitory facilities, provided adequate off-street parking areas in accord with Windham Site Plan Regulations are provided and there is no external change of appearance of any dwelling converted for such use but not including outdoor, overnight storage of commercial vehicles or the outdoor storage or more than one unregistered vehicle.

602.2.3 Cemeteries, hospitals, sanitariums, or other medical institutions, including non-profit research laboratories, nursing homes or charitable institutions.

602.2.4 Golf courses of at least 9 holes, not including miniature golf, are allowed. The golf course must have sufficient off-street parking areas in conformance with Section 704 Off Street Parking and Loading Areas, Section 705 Open Space and Landscaping Requirements, and the site plan regulations. Clubhouse, pro-shop, locker room, snack bar, parking and maintenance facilities associated with the golf course are considered part of the golf course. No structure or parking lot is permitted within 100 feet of the side or rear property lines of the golf course. Ancillary facilities may be developed in conjunction with a golf course but are limited to a restaurant, a function hall, racquet and/or outdoor tennis courts, putting greens, driving range, and a fitness center. The ancillary facilities shall not exceed twenty percent (20%) of the area of the golf course and shall be contiguous. Such facilities shall be permitted to continue operation only as long as the golf course is operating and maintained in good condition.

602.2.5 Pitch and Putt and Par3 golf courses of at least 9 holes, not including miniature golf or driving ranges, are allowed. Permitted facilities to support the golf course include clubhouse, pro-shop, locker room, snack bar, parking, and maintenance facilities. Facilities operated out of existing structures or facilities utilizing areas of 1,000 square feet or less connected to an existing structure, are exempt from the setback requirements but can be no closer than existing building setbacks. Otherwise, no structure or parking lot is permitted within 100 feet of the side or rear property lines of the golf course. The ancillary facilities shall not exceed twenty percent (20%) of the area of the golf course and shall be contiguous. Such facilities shall be permitted to continue operation only as long as the golf course is operating and maintained in good condition.

603. Residence District A, B, and C: The Residence Districts are intended as an area district for residences:

603.1 Uses Permitted in the Residence A, B, & C Districts:

603.1.1 One single-family detached dwelling per lot.

603.1.2 Fields, woodlots and greenhouse as permitted in the Rural District.

603.1.3 Accessory buildings and uses.

603.1.4 In Residence "B" there is also permitted structures containing more than one (1) dwelling unit. There shall be a maximum of six (6) dwelling

units per multifamily dwelling. Structures containing more than two (2) dwelling units shall be subject to Site Plan Review.

603.1.5 There may be outdoor, overnight parking of one commercial vehicle having less than 6,000 G.V.W. and two or less axles. The outdoor, overnight parking of one unregistered motor vehicle is permitted. (For recreational vehicles, see Section 709)

603.1.6 Accessory apartments as permitted in Section 602.1.9.

603.1.7 Home Occupations as permitted in Section 602.1.6.

603.2 Additional Uses in the Residence District C:

603.2.1 Manufactured housing parks, provided that there is conformance with the Town of Windham, NH design and construction standards and in the Subdivision and Site Plan Regulations:

603.2.1.1 That all utility wires must be underground.

603.2.1.2 Approval by the Windham Board of Health.

603.2.1.3 Subject to Site Plan review by the Planning Board.

The number of residential units in a Manufactured Home Park shall be calculated as follows:

603.2.1.4 Remove the following non-buildable areas: regulatory floodway, wetlands, and the Wetland and Watershed Protection Districts;

603.2.1.5 Remove the parcel's front, side and rear yards as non-buildable areas;

603.2.1.6 Add up the remaining buildable area in acres and multiply by three (3) or 1.5 in the Aquifer Protection District to determine the maximum amount of residential units;

603.2.1.7 Set aside a minimum of one (1) acre of contiguous buildable area or W.W.P.D. for common open space per ten (10) residential units.

603.2.1.8 Each manufactured home shall have at least 7,500 square feet of lease lot area. This area shall be at least seventy-five feet (75') wide;

603.2.1.8.1 Each manufactured home shall be set back from another manufactured home by at least twenty feet (20');

603.2.1.8.2 Every manufactured home shall have two off-street parking spaces on each lease lot. For every five (5) manufactured homes there shall be one (1) recreational vehicle parking space in a community parking lot.

603.2.2 Residential C must meet all requirements of Residential A, table of requirements, except manufactured housing shall be allowed with the following requirements:

603.2.2.1 Manufactured housing must be built in conformance with all acceptable building codes of the Town of Windham.

603.2.2.2 All requirements listed in Table of Requirements must be met with the exception of the living area per unit which shall be 600 square feet minimum.

604. Neighborhood Business District:

The Neighborhood Business District is intended primarily for business which provides goods and services for the residents of the area.

604.1 Uses permitted, subject to Site Plan Approval as provided in Windham Site Plan Regulations.

604.1.1 Retail store or service establishment, the principle activity of which shall be the offering of goods or services at retail within the building, for supply of the normal shopping needs of and for consumption by the residents of the area. Store sign lights must be off after 10:00 p.m. and store must close at 11:00 p.m.

604.1.2 Business or professional offices and banks.

604.1.3 Restaurants or other places for serving food within the structure. No food or drink shall be served after 10 p.m. Drive-throughs are not permitted.

604.1.4 Parking areas or garages for use of employees, customers, or visitors, subject to design standards in Section 704.

604.1.5 Accessory building and uses.

604.1.6 Signs as provided in Windham Sign Ordinance.

604.1.7 Assembly halls, banquet halls, kindergartens and nursery schools.

604.1.8 A single dwelling unit allowed as an accessory use to a commercial enterprise provided it is contained within the same structure.

604.1.9 Overnight parking as permitted in Section 603.1.5.

605. Business Commercial District A and B and Gateway Commercial District: The Business-Commercial District A is intended primarily for business which provides goods and services to the motoring and transient public.

605.1 Uses permitted in the Business Commercial A District subject to Site Plan approval as provided in Windham Site Plan Regulations.

605.1.1 Uses permitted in a Neighborhood-Business District, Section 604.1:

605.1.1.1 Retail store or service establishment, the principle activity of which shall be the offering of goods or services at retail within the building, for supply of the normal shopping needs of, and for consumption by, the residents of the area.

605.1.1.2 Business or professional offices or banks.

605.1.1.3 Parking areas or garages for use of employees, customers or visitors subject to design standards in Section 704. Drive-throughs are not permitted.

605.1.1.4 Accessory building and uses.

605.1.1.5 Signs as provided in Windham Sign Ordinance.

605.1.2 Hotel, motels, or lodging houses.

605.1.3 Restaurants or other places for serving food. Drive-throughs are not permitted.

605.1.4 Gasoline service stations, garages and repair shops provided that:

605.1.4.1 Repairs shall be limited to minor repairs and adjustments unless conducted in a building.

605.1.4.2 There shall be no storage of motor vehicles, appliances and equipment on the premises other than those in process of repair or awaiting delivery or in an enclosed structure or required in the operation of the service stations, garages or repair shops.

605.1.4.3 Gasoline service stations with fuel storage tanks serving: 1) the general public, or 2) members of a retail membership club, shall not be located within 1,000 feet of a water body used for domestic water supply as measured from the normal high water mark or within 1,000 feet of an Aquifer Protection District.

605.1.5 Salesroom and all outside sales areas require Site Plan approval by the Planning Board.

605.1.6 Funeral homes, mortuaries or crematories.

605.1.7 Passenger depots, terminals and utility structures.

605.1.8 Membership clubs.

605.1.9 Theaters, halls, bowling alleys, skating rinks, clubs, other places of amusement or assembly and museums, providing all business is conducted within the building.

605.1.10 Telephone exchange buildings, radio stations, television stations, commercial antenna structures, and other utility structures subject to the provisions of Section 701.3.

605.1.11 Adult entertainment ordinance:

605.1.11.1 Purpose and intent: It is the purpose of this article to establish reasonable and uniform regulations to prevent the concentration of sexually oriented businesses within the Town of Windham; and, it is the intent to promote the health, safety and general welfare of the citizens of the Town of Windham; and, it is the intent of this article that the regulations be utilized to prevent problems of blight and deterioration which accompany and are brought about by the concentration of sexually oriented businesses; and, the provisions of this amendment have neither the purpose nor the effect of imposing limitation or restriction on the content of any communicative materials, including sexually oriented materials; and, it is not the intent nor effect of this article to restrict or deny access by adults to sexually oriented materials protected by the First Amendment, or to deny access by the distributors and exhibitors of sexually oriented entertainment to

their intended market; and, neither is it the intent nor effect of this article to condone or legitimize the distribution of obscene material.

605.1.11.2 Definitions of sexually oriented businesses: A sexually oriented business is any place of business at which any of the following activities is conducted:

Adult Bookstore or Adult Video Store: A business that devotes more than 15% of the total display, shelf, rack, table, stand or floor area, utilized for the display and sale of the following:

1. Books, magazines, periodicals, or other printed matter, or photographs, films, motion pictures, video cassettes, slides, tapes, records, CD-ROMS or other forms of visual or audio representations which meet the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1; or,
2. Instruments, devices or paraphernalia which are designed for use in connection with "sexual conduct" as defined in RSA 571 - B:1, other than birth control devices

An adult bookstore or adult video store does not include an establishment that sells books or periodicals as an incidental or accessory part of its principal stock and trade and does not devote more than 15% of the total floor area of the establishment to the sale of books and periodicals.

Adult Motion Picture Theater: An establishment with a capacity of five or more persons, where for any form of consideration, films, motion pictures, video cassettes, slides or similar photographic reproductions are shown, and in which a substantial portion of the total presentation time is devoted to the showing of material which meets the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1, for observation by patron. For the purposes of this Section and subsections C, D, E, F, and G, a substantial portion of the total presentation time shall mean the presentation of films or shows described above for viewing on more than seven (7) days within any fifty-six (56) consecutive day period.

Editorial Note: The reference to subsections C, D, E, F, and G is the next five definitions - Adult motion picture arcade, Adult drive in theater, Adult cabaret, Adult motel, and Adult theater.

Adult Motion Picture Arcade: Any place to which the public is permitted or invited wherein coin or slug-operated or electronically, electrically or mechanically controlled still or motion picture machines, projectors, or other image-producing devices are maintained to show images to four (4) or fewer persons per machines at any one time, in which a substantial portion of the total presentation time of the images so displayed is devoted to the showing of material which means the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1.

Adult Drive-In Theater: An open lot or part thereof, with appurtenant

facilities, devoted primarily to the presentation of motion picture, films, theatrical productions and other forms of visual productions, for any form of consideration to persons in motor vehicles or on outdoor seats, in which a substantial portion of the total presentation time being presented for observation by patrons is devoted to the showing of material which meets the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1.

Adult Cabaret: A nightclub, bar, restaurant, or similar establishment which during a substantial portion of the total presentation time feature live performances which meet the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1, and/or feature films, motion pictures, video cassettes, slides or other photographic reproductions, a substantial portion of the total presentation time of which is devoted to showing of material which meets the definition of "harmful to minors" and/or "Sexual conduct" as set forth in RSA 571-B:1.

Adult Motel: A motel or similar establishment offering public accommodations for any form of consideration which provides patrons with closed circuit television transmissions, films, motion pictures, video cassettes, slides or other photographic reproductions, a substantial portion of the total presentation time of which are distinguished or characterized by an emphasis upon the depiction or description of materials which meet the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1.

Adult Theater: A theater, concert hall, auditorium or similar establishment either indoor or outdoor in nature, which, for any form of consideration, regularly features live performances, a substantial portion of the total presentation time of which are distinguished or characterized by emphasis on activities which meet the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1.

Nude Model Studio: A place where a person who appears in a state of nudity or displays male genitals in a state of sexual arousal and/or the vulva or more intimate parts of the female genitals and is observed, sketched, drawn, painted, sculptured, photographed, or similarly depicted by other persons who pay money or any form of consideration or such display is characterized by an emphasis on activities which meets the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1.

Sexual Encounter Center: A business or commercial enterprise that as one of its primary business purposes, offers for any form of consideration: (a) physical contact in the form of wrestling or tumbling between persons of the opposite sex; or (b) activities between male and female persons and/or persons of the same sex when one or more persons is in the state of nudity; or where the activities in (a) or (b) is characterized by an emphasis on activities which meets the definition of "harmful to minors" and/or "sexual conduct" as set forth in RSA 571-B:1.

605.1.11.3 Allowed Locations and Location Restrictions of Sexually Oriented Businesses:

SEXUALLY ORIENTED BUSINESSES, as defined above shall be permitted only within the following designated area of the Business Commercial A District:

That part of the Business A District bounded on the south by the Windham/Salem Town line, on the west by the former B&M Railroad right of way, on the north by the southerly side of Roulston Road, and crossing Route 28 on the southerly side of former Witch Hazel Road, and easterly by line drawn 500 feet easterly of and perpendicular to center line of Route 28; provided that all other regulations, requirements and restrictions in the Business Commercial A zone are met; and no sexually oriented business shall be permitted within 1,000 feet of another existing sexually oriented business, and no other sexually oriented business shall be permitted within a building, premise, structure or other facility that contains a sexually oriented business as defined in paragraphs A through I above.

605.1.11.4 Measure of Distance:

The distance between any two sexually oriented businesses shall be measured in a straight line, without regard to intervening structures, from the closest exterior structural wall or temporary or permanent physical divider between each business.

605.1.11.5 Additional Reasonable Regulations:

The Planning Board is empowered hereunder to review and approve permit applications for sexually oriented businesses and impose reasonable restrictions for buffering, outdoor lighting, parking, adequate ingress and egress from the site off of and onto public roads, pedestrian movement, and to provide for appropriate landscaping and building aesthetics in the "Site Plan Review Regulations of the Town of Windham, New Hampshire," and to avoid site development layout which may result in negative environmental impacts.

605.1.11.6 Severability:

The invalidity of any section or provisions of this article shall not invalidate any other section of provision thereof.

605.1.12 Retail and Wholesale automobile sales utilizing outdoor display areas shall be at least 1,500 feet apart. The distance shall be measured in a straight line, without regard to intervening structures, from the closest lot line.

605.2 The Business Commercial District B is Intended Primarily for Business Which Provides Services to the Public:

605.2.1 Uses Permitted: subject to Site Plan Approval as provided in Windham Site Plan Regulations:

605.2.1.1 Hotels, motels

605.2.1.2 Restaurants. Drive-throughs are not permitted.

605.2.1.3 Membership clubs, halls

605.2.1.4 Accessory buildings and uses

605.2.1.5 Business or professional offices or banks

605.2.1.6 Telephone exchange buildings, radio stations, television stations, commercial antenna structures, and other utility structures subject to the provisions of Section 701.3.

605.3 Gateway Commercial District:

605.3.1 Authority and Purpose: This Section is adopted pursuant to the authority of RSA 674:16 and RSA 674:21 and shall be known as the Gateway Commercial District. If any provisions of this section differs or appears to conflict with any provisions of the Zoning Ordinance or other ordinance or regulation, the provisions of this section shall govern.

The purpose of the Gateway Commercial District is to:

Recognize the District's close proximity to and visibility from the Interstate Highway and from State Routes 111 and 111A;

Provide for an area of high quality commercial development at the major highway interchange within the Town;

Allow mixed uses of retail and professional offices in the Route 93 Exit 3 area;

Minimize sprawl and encourage sustainable commercial development in the I-93 Exit 3 area;

Maintain efficient traffic circulation to facilitate the safe and convenient movement of people and goods;

Enhance the aesthetic quality and economic vitality of the Exit 3 area and the tax base of the Town of Windham;

Establish an area for businesses that provide goods and services to the residents of Windham and the transient public;

Ensure that new projects in the District will be of architectural merit and be designed to take advantage of their proximity to the Interstate highway system;

The purpose of the District will be accomplished through the performance and design standards that all new projects within the District must satisfy.

605.3.2 Uses Permitted: Subject to Site Plan approval as provided in the Windham Site Plan Regulations: Retail and wholesale sales establishments (excluding wholesale warehouse distribution centers); eating and drinking establishments where consumption is primarily intended to be on the premises; medical and professional offices; business services; banks; civic, public, and institutional facilities; schools; day care facilities; and personal and professional services. Accessory buildings and uses, customarily associated with and incidental to the above referenced permitted uses, shall be allowed subject to Site Plan review and approval.

605.3.2.1 Retail and wholesales establishments (excluding wholesale warehouse distribution centers);

605.3.2.2 Eating and drinking establishments where consumption is primarily intended to be on the premises;

605.3.2.3 Medical and professional offices

605.3.2.4 Business services;

605.3.2.5 Banks; civic, public, and institutional facilities;

605.3.2.6 Schools; day care facilities;

605.3.2.7 Personal and professional services;

605.3.2.8 Accessory buildings and uses, customarily associated with and incidental to the above referenced permitted uses, shall e allowed subject to Site Plan review and approval.

605.3.3 Performance Standards: Development proposals shall conform to the development standards prescribed in the Town of Windham Site Plan Review Regulations. Additionally, the following Performance Standards shall apply to all developments within the Gateway Commercial District:

605.3.3.1 A minimum twenty-foot (20') landscaped buffer shall be required on any lot line where the abutting parcel is not situated within the Gateway Commercial District. The Planning Board may waive planting requirements where it deems visual or safety issues exist. Existing improvements that are situated within the landscaped buffer, and which are to be retained and reused as part of any Plan, may be permitted to remain within the buffer area;

605.3.3.2 Shared parking facilities and driveways shall be encouraged and provided where feasible. Parking spaces requirements may be reduced where shared parking is designed to maximize complimentary uses provided the Applicant can demonstrate, pursuant to Section 704 of this Zoning Ordinance, that sufficient parking will be available when it is needed. The use of parking decks is not required, but consideration of their possible use is encouraged where feasible to reduce the footprint of the area of required parking;

605.3.3.3 There shall be fifty-feet (50') of lot frontage required on a Class V or better road. For the purposes of this subsection, frontage along Interstate 93 shall not be counted;

605.3.3.4 There shall be no front, side or rear lot line setback requirements except that there shall be a 20-foot setback from the Route 111 right-of-way, and the Route 111A right-of-way. The Planning Board shall consult with the Windham Fire Department and the Windham Police Department in determining the proper location, siting and separation of proposed structures so as to insure that proper emergency access is incorporated into the design of the site;

605.3.3.5 Public and private roads and driveways within this district should be designed to include traffic calming techniques (e.g. speed reduction measures);

605.3.3.6 Existing buildings, with historical significance, as recommended by the Heritage Commission, should be preserved and reused for allowed uses with shared parking and driveways. Such shared parking should be located and designed to minimize its visual impact;

605.3.3.7 The mixed use of buildings is encouraged - for example retail uses on the first floor, and office uses on the second floor - provided the nature and operation of the uses are sufficiently complimentary so as no to conflict.

605.3.3.8 Open squares or plazas, and pedestrian walkways, shall be provided. The Planning Board shall require pedestrian and bicycle access and circulation as an integral element of the design of any site. Where deemed appropriate, the Planning Board may require the Applicant to provide for the extension of pedestrian/bicycle access ways to the property lines, and the interconnection of access ways with those on adjacent parcels. All open squares, plazas, pedestrian walkways and bicycle paths may be used to satisfy minimum open space requirements;

605.3.3.9 All utilities shall be located underground, except where specifically exempted by the Planning Board.

605.3.4 There shall be no minimum lot size. However the Applicant must demonstrate, to the satisfaction of the Planning Board, that there are adequate utilities, parking, water supply, and sewage disposal capacity - either on-site or available to the site - to safely support the use(s) proposed for the subject site. Where an applicant is proposing or contemplating the use of cooperative agreements, easements, covenants, or other such legal contracts, copies of all such documents shall be submitted to the Planning Board for its review and approval. Any such documents shall also be reviewed by Town Counsel to ensure legal form, ownership, and enforceability;

605.3.5 The Planning Board will review each proposal for compliance with the stated purpose of the district to promote a mixture of complimentary land uses.

605.4 Conditions for Approval: Conditions for approval of permitted uses in the Business Commercial Districts A and B, and the Gateway Commercial District, shall be as provided in Section 606.2.

606. Limited Industrial District: The Limited Industrial District is intended for use by research laboratories, office buildings and industries which are compatible with a low-density, rural residential community.

606.1 Uses permitted: upon approval of a Site Plan as required in Windham Site Plan Regulations:

606.1.1 Research laboratories, office buildings or banks.

606.1.2 Manufacturing enterprises, provided that such activities will not be offensive, injurious or noxious because of sewerage and refuse, vibration, smoke or gas, fumes, dust or dirt, odors, danger of combustion or unsightliness.

606.1.3 Building materials warehouses with an accessory sales room of less than 500 square feet, utility structures, contractor's yards, storage warehouses and buildings and wholesale distribution plants, provided that all loading and unloading is done at the rear of the building in covered berths and provided all materials and equipment stored outside are screened from view from public ways or abutting properties in a residence district except that items on display for retail sales need be screened only from properties in a residential district.

606.1.4 Printing or publishing establishments, photographic studios, medical or dental laboratories, subject to the restrictions in Sections 606.1.2 and 606.1.3.

606.1.5 Cafeterias for employees and other normal accessory uses, when contained in the same structure as a permitted use.

606.1.6 An apartment in a principle structure for occupancy by a watchman or caretaker.

606.1.7 Gasoline service stations, garages and repair shops provided that:

606.1.7.1 Repairs shall be limited to minor repairs and adjustments unless conducted in a building.

606.1.7.2 There shall be no storage of motor vehicles, appliances and equipment on the premises other than those in process of repair or awaiting delivery or in an enclosed structure or required in the operation of the service stations, garages or repair shops.

606.1.7.3 Gasoline service stations with fuel storage tanks serving: 1) the general public, or 2) members of a retail membership club, shall not be located within 1,000 feet of a water body used for domestic water supply as measured from the normal high water mark or within 1,000 feet of an Aquifer Protection District.

606.1.8 Passenger depots, terminals and utility structures.

606.1.9 Telephone exchange buildings, radio stations and other utility structures.

606.1.10 Restaurants.

606.1.11 Contractor yards and storage yards.

606.1.12 Firearms shooting ranges, whether indoor or outdoor, shall be allowed only in the Limited Industrial District. No firearms shooting range shall be allowed within 300 feet of any occupied building. Nothing in this section shall prohibit an otherwise allowed building from being constructed within this setback from a pre-existing firearms shooting range.

606.1.13 Health, fitness, and recreational establishments with primarily indoor facilities.

606.2 Conditions for Approval:

606.2.1 Building Construction: All buildings shall be of construction prescribed in the Building Code of the Town of Windham.

606.2.2 Odor, Dust and Smoke: No such emissions shall be discernible beyond the property line or in the case of an industrial park development or of multiple use of the property, beyond one hundred feet (100') of the building generating the emission, except that in no case shall the discharge from any source exceed the following limits:

606.2.2.1 Smoke measured at the point of discharge into the air shall not exceed a density of No. 1 on the Ringlemen Smoke Chart as published by the U.S. Bureau of Mines, except that a smoke of a density not darker than No. 2 on the Ringleman Chart may be emitted for not more than three (3) minutes in any one (1) hour.

606.2.2.2 Lime dust, as CaO, measured at the property line of any lot on which the activity creates such dust shall not exceed ten (10) micrograms per cubic meter of air.

606.2.2.3 Total particulate matter measured at all stacks or other points of emission to the air shall not exceed thirty (30) grams per hour per acre of land included in the lot.

606.2.2.4 All measurements of air pollution shall be by the procedures and with equipment approved by the Building Inspector, which procedures and equipment shall be of the latest generally recognized development and design readily available.

606.2.2.5 No open burning is permitted.

606.2.3 Omitted

606.2.4 Heat, Glare, Vibration and Radiation: No heat, glare or vibration shall be discernible without instruments from the outside of any structure and no nuclear radiation shall be discernible from the outside of the structure with or without instruments

606.2.5 Exterior Lighting: No exterior lighting, other than street lighting approved by the Selectmen, shall shine on adjacent properties or towards any street.

606.2.6 Storage: All materials, supplies and equipment shall be stored in accord with Occupancy Standards and Process Hazards of the National Fire Protection Association National Fire Codes Volume 9 as amended, and shall be screened from view from public ways or abutting properties.

606.2.7 Waste Disposal and Water Supply: Regulations of the Town Board of Health shall be met and shall be as indicated on the approved Site Plan. Hazardous waste materials shall not be disposed of on-site, or stored on site for more than thirty (30) days. "Hazardous Waste" shall be as defined by state and federal regulations. (See appropriate RSA #, or as amended.)

606.2.8 Screening, Surfacing, Parking and Signs: As provided in Section 700. of this Ordinance.

606.2.9 Neighborhood Impacts: Any potential neighborhood impacts from traffic, noise from construction, and hours of operation shall be identified by the Applicant and a mitigation plan submitted to the Planning Board for review and approval.

607. Flood Plain District: This ordinance, adopted pursuant to the authority of RSA 674:16, shall be known as the Town of Windham Floodplain Development Ordinance. The regulations in this ordinance shall overlay and supplement the regulations in the Town of Windham Zoning Ordinance, and shall be considered part of the Zoning Ordinance for purposes of administration and appeals under state law. If any provision of this ordinance differs or appears to conflict with any provision of the Zoning Ordinance or other ordinance or regulations, the provision imposing the greater restriction or more stringent standard shall be controlling.

The following regulations in this ordinance shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for Rockingham County, New Hampshire" dated May 17, 2005 or as amended, together with the associated Flood Insurance Rate Map Panels numbered 528, 529, 531, 532, 533, 534, 536, 537, 538, 539, 541, 543, 545, 551, 553, and 561 dated May 17, 2005 or as amended, which are declared to be part of this ordinance and are hereby incorporated.

607.1 Definition of Terms: The following definitions shall apply only to this Floodplain development Ordinance, and shall not be affected by, the provisions of any other ordinance of the Town of Windham.

Area of Special Flood Hazard: is the land in the floodplain within the Town of Windham subject to a one-percent or greater possibility of flooding in any given year. The area is designated on the FIRM as Zones A and AE.

Base Flood: means the flood having a one-percent possibility of being equaled or exceeded in any given year.

Basement: means any area of a building having a floor subgrade on all sides.

Building: see "Structure".

Development: means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operation, or storage of equipment or materials.

FEMA: means the Federal Emergency Management Agency.

Flood or Flooding: means a general and temporary condition of partial or complete inundation of normally dry land areas from:

1. the overflow of inland or tidal waters.
2. the unusual and rapid accumulation or runoff of waters from any source.

Flood Elevation Study: means an examination, evaluation, and determination of flood hazards and if appropriate, corresponding water surface elevations, or an examination and determination of mudslide or flood - related erosion hazards.

Flood Insurance Rate Map (FIRM): means an official map incorporated with this ordinance, on which FEMA has delineated both the special flood hazard areas and the risk premium zones applicable to the Town of Windham.

Flood Insurance Study: see "Flood Elevation Study".

Floodplain or Flood-prone Area: means any land area susceptible to being inundated by water from any source (see definition of "flooding").

Flood Proofing: means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitation facilities, structures and their contents.

Floodway: see "Regulatory Floodway".

Functionally Dependent Use: means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking and port facilities that are necessary for the loading/unloading of cargo or passengers, and ship building/repair facilities but does not include long-term storage or related manufacturing facilities.

Highest Adjacent Grade: means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

Historic Structure: means any structure that is:

1. Listed individually in the National Register of Historic Places (a listing maintained by the Dept. of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
2. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
3. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or
4. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
 - 4.1 By an approved state program as determined by the Secretary of the Interior, or
 - 4.2 Directly by the Secretary of the Interior in states without approved programs.

Lowest Floor: means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such an enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

Manufactured Home: means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For floodplain management purposes the term "manufactured home" includes park trailers, travel trailers, and other similar vehicles placed on site for greater than 180 days. This includes manufactured homes located in a manufactured home park or subdivision.

Manufactured Home Park or Subdivision: means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Mean Sea Level: means the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a communities Flood Insurance Rate Map are referenced.

New construction: means, for the purposes of determining insurance rates, structures for which the start of construction" commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For floodplain management purposes, new construction means structures for which the start of construction commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

100-year Flood: see "Base Flood".

Recreational vehicle: means a vehicle which is (1) built on a single chassis; (2) 400 square feet or less when measured at the largest horizontal projection; (3) designed to be self propelled or permanently towable by a light duty truck; and (4) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use.

Regulatory Floodway: means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Special Flood Hazard Area: see "Area of Special Flood Hazard".

Structure: means for floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

Start of Construction: includes substantial improvements, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on site, such as the pouring of slab or footings, the installation of piles, the construction of columns or any work beyond the stage of excavation; or the placement of manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or part of the main structure.

Substantial Damage: means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Substantial Improvement: means any combination of repairs, reconstruction, alteration, or improvements to a structure in which the cumulative cost equals or exceeds fifty percent of the market value of the structure. The market value of the structure should equal: (1) the appraised value prior to the start of the initial repair or improvement, or (2) in the case of damage, the value of the structure prior to the damage occurring. For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. This term includes structures which have incurred substantial damage, regardless of actual repair work performed. The term does

not, however, include any project for improvement of a structure required to comply with existing health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions or any alteration of a "historic structure", provided that the alteration will not preclude the structure's continued designation as a "historic structure".

Violation: means the failure of a structure or other development to be fully compliant with the community's flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in 44CFR § 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

Water Surface Elevation: means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, (or other datum, where specified) of floods of various magnitudes and frequencies in the floodplains.

607.2 The Code Enforcement Administrator and/or Building Inspector shall review all building permit applications for new construction or substantial improvements to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is located in a special flood hazard area, all new construction or substantial improvements shall:

607.2.1 be designed (or modified) and adequately anchored to prevent floatation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy,

607.2.2 be constructed with materials resistant to flood damage,

607.2.3 be constructed by methods and practices that minimize flood damages,

607.2.4 be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

607.3 Where new or replacement water and sewer systems (including on-site systems) are proposed in a special flood hazard area the applicant shall provide the Code Enforcement Administrator and/or Building Inspector with assurance that these systems will be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood water, and on-site waste disposal systems will be located to avoid impairment to them or contamination from them during periods of flooding.

607.4 For all new or substantially improved structures located in Zones A and AE, the applicant shall furnish the following information to the Code Enforcement Administrator and/or Building Inspector:

607.4.1 the as-built elevation (in relation to NGVD) of the lowest floor (including basement) and include whether or not such structures contain a basement.

607.4.2 if the structure has been floodproofed, the as-built elevation (in relation to NGVD) to which the structure was floodproofed.

607.4.3 any certification of floodproofing. The Code Enforcement Administrator and/or Building Inspector shall maintain for public inspection, and shall furnish such information upon request.

607.5 The Code Enforcement Administrator and/or Building Inspector shall not grant a building permit until the applicant certifies that all necessary permits have been received from those governmental agencies from which approval is required by federal or state law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

607.6 Plans and Specifications:

607.6.1 In riverine situations, prior to the alteration or relocation of a watercourse the applicant for such authorization shall notify the Wetlands Bureau of the New Hampshire Department of Environmental Services and submit copies of such notification to the Code Enforcement Administrator and/or Building Inspector, in addition to the copies required by RSA 483-A: 1-b. Further, the applicant shall be required to submit copies of said notification to those adjacent communities as determined by the Code Enforcement Administrator and/or Building Inspector, including notice of all scheduled hearings before the Wetlands Bureau, the Windham Conservation Commission, and the Windham Planning & Zoning Board.

607.6.2 The applicant shall submit to the Code Enforcement Administrator and/or Building Inspector certification provided by a registered professional engineer, assuring that the flood carrying capacity of an altered or relocated watercourse can and will be maintained.

607.6.3 Along watercourses with a designated Regulatory Floodway no encroachments, including fill new construction, substantial improvements, and other development are allowed within the floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practices that the proposed encroachment would not result in any increase in flood levels within the community during the base flood discharge

607.6.4 Until a Regulatory Floodway is designated along watercourses, no new construction, substantial improvements, or other development (including fill) shall be permitted within Zone AE on the FIRM, unless it is demonstrated by the applicant that the cumulative effect of the proposed development, when combined with all existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

607.6.5 The Code Enforcement Administrator and/or Building Inspector shall obtain, review, and reasonably utilize any floodway data available from Federal, State, or other sources as criteria for requiring that all development located in Zone A meet the following floodway requirement:

607.6.5.1 No encroachments, including fill, new construction, substantial improvements, and other development are allowed within the floodway that would result in any increase in flood levels within the community during the base flood discharge.

607.7 Flood Plain Determination:

607.7.1 In special flood hazard areas the Code Enforcement Administrator and/or Building Inspector shall determine the 100 year flood elevation in the following order of precedence according to the data available:

607.7.1.1 In Zone AE, refer to the elevation data provided in the community's Flood Insurance Study and accompanying FIRM or FHBM.

607.7.1.2 In Zone A the Code Enforcement Administrator and/or Building Inspector shall obtain, review, and reasonably utilize any 100 year flood elevation data available from any federal, state or other source including data submitted for development proposals submitted to the community (i.e., subdivisions, site approvals).

607.7.2 The Code Enforcement Administrator and/or Building Inspector's 100 year flood elevation determination will be used as criteria for requiring in Zones A and AE that:

607.7.2.1 All new construction or substantial improvement of residential structures have the lowest floor (including basement) elevated to or above the 100 year flood elevation;

607.7.2.2 That all new construction or substantial improvements of non-residential structures have the lowest floor (including basement) elevated to or above the 100 year flood level; or together with attendant utility and sanitary facilities, shall:

607.7.2.2.1 be flood-proofed so that below the 100 year flood elevation the structure is watertight with walls substantially impermeable to the passage of water;

607.7.2.2.2 have structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy; and

607.7.2.2.3 be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions of this section.

607.7.2.3 All manufactured homes to be placed or substantially improved within special flood hazard areas shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is at or above the base flood level; and be securely anchored to resist floatation, collapse, or lateral movement. Methods of anchoring may include, be are not limited to, use of over-the-top frame ties to ground anchors. This requirement is in addition to applicable state and local anchoring requirements for resisting wind forces;

607.7.2.4 For all new construction and substantial improvements, fully enclosed areas below the lowest floor that are subject to flooding are permitted provided they meet the following requirements:

607.7.2.4.1 the enclosed area is unfinished or flood resistant usable solely for the parking of vehicles, building access or storage;

607.7.2.4.2 the area is not a basement;

607.7.2.4.3 shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be

provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwater.

607.7.2.4.4 Recreational vehicles placed on sites within Zones A and AE shall either (i) be on the site for fewer than 180 consecutive days, (ii) be fully licensed and ready for highway use, or (iii) meet all standards for Section 60.3 (b) (1) of the National Flood Insurance Program Regulations and the elevation and anchoring requirements for "manufactured homes" in Paragraph (c) (6) of Section 60.3.

607.8 Variances & Appeals:

607.8.1 Any order, requirement, decision or determination of the Code Enforcement Administrator and/or Building Inspector made under this ordinance may be appealed to the Zoning Board of Adjustment as set forth in RSA 676:5.

607.8.2 If the applicant, upon appeal, requests a variance as authorized by RSA 674:33, I(b), the applicant shall have the burden of showing in addition to the usual variance standards under state law:

607.8.2.1 that the variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense.

607.8.2.2 that if the requested variance is for activity within a designated regulatory floodway, no increase in flood levels during the base flood discharge will result.

607.8.2.3 that the variance is the necessary, considering the flood hazard, to afford relief.

607.8.3 The Zoning Board of Adjustment shall notify the applicant in writing:

607.8.3.1 the issuance of a variance to construct below the base flood level will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage and

607.8.3.2 such construction below the base flood level increases risks to life and property. Such notification shall be maintained with a record of all variance actions.

607.8.4 The community shall:

607.8.4.1 maintain a record of all variance actions, including their justification for their issuance, and

607.8.4.2 report such variances issued in its annual or biennial report submitted to FEMA'S Federal Insurance Administrator.

608. Historic District: Separate document

609. Aquifer Protection District:

609.1 Authority and Purpose: Pursuant to RSA 674:16 and 21, the Town of Windham adopts an Aquifer Protection District and accompanying regulations in

order to protect, preserve, and maintain potential groundwater supplies and related groundwater recharge areas within known aquifers identified by the Town. The objectives of the aquifer protection district are:

- to protect the public health and general welfare of the citizens of Windham.
- to prevent development and land use practices that would contaminate or reduce the recharge to the identified aquifers.
- to assure the availability of public and private water supplies for future growth of the Town in accordance with the Master Plan
- to encourage uses that can appropriately and safely be located in the aquifer recharge areas.

609.2 Definitions:

Animal Feedlot: A commercial agricultural establishment consisting of confined feeding areas and related structures used for the raising of livestock. An animal feedlot shall be considered one on which more than five (5) animals are raised simultaneously.

Aquifer: for the purpose of this Section, aquifer means an unconsolidated geologic formation, group of formations, or part of a formation that is capable of yielding quantities of groundwater usable for municipal or private water supplies.

Dwelling Unit: A building or that portion of a building consisting of one or more rooms designed for living and sleeping purposes, including kitchen and sanitary facilities and intended for occupancy by not more than one family or household.

Groundwater: All the water below the land surface in the zone of saturation or in rock fractures capable of yielding water to a well.

Groundwater Recharge: The infiltration of precipitation through surface soil materials into groundwater. Recharge may also occur from surface waters, including lakes, streams, and wetlands.

Leachable Wastes: Waste materials, including solid wastes, sludge and agricultural wastes that are capable of releasing contaminants to the surrounding environment.

Minimum Lot Size: See definition in Windham Zoning Ordinance, Notes for Table, No. 1.

Mining of Land: The removal of geologic materials such as topsoil, sand and gravel, metallic ores, or bedrock to be crushed or used as building stone.

Non-Conforming Use: Any lawful use of buildings, structures, premises, land or parts thereof existing as of the effective date of this Section, or amendment thereto, and not in conformance with the provisions of this Section, shall be considered to be a non-conforming use.

Non-Municipal Well: Any well not owned and operated by the Town of Windham or its agents.

Recharge Area: The land surface area from which groundwater recharge occurs.

Sludge: Residual materials produced by the sewage treatment process.

Solid Waste: Any discarded or abandoned material including refuse, putrescible material, septage, or sludge, as defined by New Hampshire Solid Waste Rules

He-P 1901.03. Solid waste includes solid, liquid, semi-solid, or gaseous waste material resulting from residential, industrial, commercial, mining, and agricultural operations and from community activities.

Structure: Anything constructed or erected, except a boundary wall or fence, the use of which requires location on the ground or attachment to something on the ground. For the purposes of this Section, buildings are structures.

Toxic or Hazardous Materials: Any substance or mixture of such physical, chemical, or infectious characteristics as to pose a significant, actual or potential hazard to water supplies, or other hazard to human health, if such a substance or mixture were discharged to land or waters of this Town. Toxic or hazardous materials include, without limitation, volatile organic chemicals, petroleum products, heavy metals, radioactive or infectious wastes, acids and alkalies, and include products such as pesticides, herbicides, solvents and thinners, and such other substances as defined in New Hampshire Water Supply and Pollution Control rules, Section WS 410.04(1), in New Hampshire Solid Waste Rules He-P 1901.3(v), and in the Code of Federal Regulations 40 CFR 261. Wastes generated by the following commercial activities are presumed to be toxic or hazardous, unless and except to the extent that anyone engaging in such an activity can demonstrate the contrary to the satisfaction of the Planning Board:

- Airplane, boat and motor vehicle service and repair;
- Chemical and bacteriological laboratory operation;
- Dry cleaning;
- Electronic circuit manufacturing;
- Metal plating, finishing and polishing;
- Motor and machinery service and assembly;
- Painting, wood preserving and furniture stripping;
- Pesticide and herbicide application;
- Photographic processing;
- Printing

609.3 District Boundaries:

609.3.1 Location: The extent of the Aquifer Protection District shall be shown on the Aquifer Protection District Map and shall be the outermost edge of the subterranean extent of all aquifer deposits presently designated as stratified drift as supported by information on the Rockingham Planning Commission Town of Windham Aquifer Map based on transmissivity dated February 20, 1995. This map is to be used in conjunction with the tax map and/or other maps of the Town as an overlay district.

See Source Appendix A at the end of this Section which lists all technical data and studies used in mapping. Information from future groundwater studies and well drilling records may be added to the Aquifer Protection District map and Source Appendix A as they become available.

609.3.2 Recharge Areas: The direct recharge area for the identified aquifer is considered to be co-terminus with that aquifer. The indirect recharge areas are those areas that contribute to groundwater recharge of the aquifers from outside the aquifer boundaries.

When development is proposed in indirect recharge areas which are tributary to the Aquifer Protection District, such as areas including a tributary stream, or on slopes adjacent to the Aquifer Protection District, the Planning Board may hire, at the developer's expense, a qualified hydrogeologist to assess the potential impact on groundwater quality and recharge rates of the aquifer from such development.

609.3.3 Appeals: Where the bounds of the identified aquifer or recharge area, as delineated, are in doubt or in dispute, any landowner aggrieved by such delineation may appeal the boundary location to the Planning Board. Upon receipt of such appeal, the Planning Board shall engage, at the landowner's expense and request, a qualified groundwater consultant to conduct an investigation and prepare a report determining the proper location and extent of the aquifer and recharge area relative to the property in question. This report shall include but not be limited to:

609.3.3.1 A detailed topographic layout of the subdivision and/or area to be developed, prepared by a registered land surveyor.

609.3.3.2 A revised soils map of the subdivision and/or area prepared by a soils scientist qualified in hydrologic studies including a written report of his onsite field inspection and test boring data.

609.3.3.3 The aquifer boundary as shown on the Aquifer Protection District Map shall be overlaid on the plat and the newly proposed boundary location shall be indicated on the same plat by a broken line.

609.3.3.4 Any additional mapping, hydrogeologic reports or information which becomes available as a result of recent or on-going scientific investigation of the location and extent of aquifers, performed by the U.S. Geological Survey, NH State agencies or boards, or the Town of Windham or the agents of any of the above.

The Planning Board may, based upon the findings of Section 609.3.3.1 through Section 609.3.3.4 above, adjust the boundary or area designation of the Aquifer Protection District or reduce or expand the area so designated so as to more correctly define the location and extent of the aquifer on a site specific, case by case basis.

The Planning Board shall reserve the right to withhold action on such plat pending the results of an on-site and/or other investigation by that Board or its appointed.

609.4 Use Regulations: The Aquifer Protection District is an zoning overlay district which imposes additional requirements and restrictions to those of the underlying, base district zoning. In all cases, the more restrictive requirement(s) and permitted uses shall apply.

609.4.1 Permitted Uses: The following activities may be permitted provided they are conducted in accordance with the purposes and intent of this Section:

609.4.1.1 All uses permitted in the underlying districts at densities permitted in the underlying districts if serviced by town water and sewer systems, otherwise at fifty (50) percent of the density of the underlying district (i.e., double the acreage requirement of the underlying district). This development shall also comply with the provisions of Section 609.5.1.2 and Section 609.5.1.4.

609.4.1.2 Activities designed for conservation of soil, water, plants and wildlife.

609.4.1.3 Outdoor recreation, nature study, boating, fishing and hunting where otherwise legally permitted.

609.4.1.4 Normal operation and maintenance of existing water bodies and dams, splash boards and other water control, supply and conservation devices.

609.4.1.5 Foot, bicycle, and/or horse paths and bridges.

609.4.1.6 Maintenance, repair, alterations of and additions to any existing structure in compliance with provisions of Section 609.4.3 and Section 609.5.1.2

609.4.1.7 Farming, gardening, nursery, forestry, harvesting and grazing provided that fertilizer, herbicides, pesticides, manure and other leachables are used appropriately in compliance with all local, state and federal regulations at levels that will not cause groundwater contamination and are stored under shelter.

609.4.2 Prohibited Uses: The following uses are prohibited in the Aquifer Protection District except where permitted to continue as a non conforming use:

609.4.2.1 Disposal of solid waste other than brush or stumps.

609.4.2.2 Storage and disposal of hazardous waste.

609.4.2.3 Disposal of liquid or leachable wastes except as allowed in Section 609.4.1.

609.4.2.4 Subsurface storage of petroleum, other refined petroleum products, and toxic or hazardous materials.

609.4.2.5 Industrial uses which discharge process waters on-site.

609.4.2.6 Use of salt on parking areas, storage of road salt or other de-icing chemicals, use of salt on roads in this District shall be minimized.

609.4.2.7 Dumping of snow containing de-icing chemicals brought from outside the district.

609.4.2.8 Animal feedlots.

609.4.2.9 Automotive service and repair shops, junk and salvage yards.

609.4.2.10 Waste injection wells.

609.4.2.11 Excavating and mining of land except where incidental to a permitted use. Note that RSA 155-E expressly provides that sand and gravel excavations should be prohibited where such activities would substantially damage a known aquifer.

609.4.3 Recharge Requirements: Impervious surfaces within the Aquifer Protection District shall be kept to a minimum. Paving requirements for underlying districts may be exempted by the Planning Board.

609.5 Design and Operations Guidelines:

The following design and operation guidelines shall be observed within the Aquifer Protection District:

609.5.1 Commercial and Industrial Facilities:

609.5.1.1 Safeguards: Provisions shall be made to protect against toxic or hazardous materials discharge or loss resulting from corrosion, accidental damage, spillage, or vandalism through measures such as: spill control provisions in the vicinity of chemical or fuel delivery points, secured storage areas for toxic or hazardous materials, and indoor storage provisions for corrodible or dissolvable materials. For operations which allow the evaporation of toxic or hazardous materials into the interiors of any structures, a closed vapor recovery system shall be provided for each such structure to prevent discharge of contaminated condensate into the groundwater.

609.5.1.2 Drainage: All runoff from impervious surfaces shall be recharged on the site and diverted toward areas covered with vegetation for surface infiltration to the extent possible. Dry wells shall be used only where other methods are not feasible and shall be preceded by oil, grease, and sediment traps to facilitate removal of contaminants.

609.5.1.3 Inspection: All commercial and industrial facilities shall be subject to twice annual inspections by the Building Inspector or other agent designated by the Selectmen. The purpose of these inspections is to ensure continued compliance with the conditions under which approvals were granted. A fee for inspection shall be charged to the owner according to a fee schedule determined by the Board of Selectmen.

609.5.1.4 Location: Where the premises are partially outside of the Aquifer Protection District Overlay Zone, potential pollution sources such as on-site waste disposal systems shall be located outside the Zone to the extent feasible.

609.6 Non-Conforming Uses:

Any non-conforming use may continue and may be maintained, repaired and improved, unless such use is determined to be a hazard to public health and safety and a detriment to water quality. No non-conforming use may be expanded (except residential uses such as indicated in Section 609.4.1.6.), changed to another non-conforming use, or renewed after it has been discontinued for a period of 12 months or more.

Appendix A

Sources of Technical Data Used in Mapping The Aquifer Protection District:
1. "Groundwater Resources of the Lower Merrimack River Valley, South Central New Hampshire", Hydrologic Investigations Atlas HA-277, James M. Weigle, 1968.

610. Housing for Older Persons:

610.1 Authority and Purpose: It is declared to be in the public interest and for the general welfare of the Town to permit the development of housing facilities specifically suited to address the special housing needs of the older persons. The provisions of this Section are adopted pursuant to the authority of RSA 674:16 and RSA 674:21, and shall overlay and supplement the other regulations of the Town of Windham Zoning Ordinance for the purpose of establishing provisions under which housing for older persons developments may be permitted by the Planning Board within certain zoning districts, and within certain areas of Windham.

610.2 Definitions: As used in this Section, the following terms shall have the meanings indicated.

610.2.1 Older Persons: 55 years of age or older.

610.2.2 Housing for Older Persons: Any of a variety of housing types or housing units intended exclusively for use and occupancy by persons aged 55 years and older (with qualified exceptions per Section 610.6.1.1).

610.2.3 Housing for Older Persons Project: One (1) or more buildings situated on contiguous parcel(s) of land and containing housing for older persons dwelling units.

610.2.4 Handicapped Accessible: Meeting the design requirements of the "Barrier-Free Design Code for the State of New Hampshire" and/or the Uniform Federal Accessibility Standards (UFAS).

610.2.5 Net Tract Area: Contiguous useable land excluding wetlands, land within the Wetlands and Watershed Protection District, and land with slopes greater than 25%.

610.2.6 Maximum Project Density: The total number of bedrooms that the subject site can support, based upon the development capability of the subject site and calculated in accordance with the provisions of this Section.

610.3 Location: Housing for older persons as defined herein may be permitted by the Planning Board:

610.3.1 In the Rural, Residence A, Residence B, and Residence C Districts.

610.4 Minimum Lot Requirements: Parcel(s) for which Housing for Older Persons is proposed shall conform to the following minimum requirements, in addition to the other provisions of the Section.

610.4.1 Parcel(s) shall have a Net Tract Area of no less than four (4) acres;

610.4.2 There shall be fifty (50) feet of frontage on an existing or proposed Class V, or better, road.

610.5 Density: The total number of bedrooms that may be permitted on the subject site is intended to be roughly equal to that density achieved by applying soil type lot size requirements. The Maximum Project Density shall be calculated in accordance with the procedure outlined below:

610.5.1 Determine the number of lots allowed by soil type using the minimum lot area requirements per Appendix A-1 of the Town of Windham Zoning Ordinance. Multiply this number by eight (8) to determine the maximum number of bedrooms possible on the subject parcel.

610.6 Awarding of Density: The Planning Board may grant portions of the Maximum Project Density in accordance with the Development Standards and Development Incentives specified herein, upon the Board's determination that the applicant's proposal meets or exceeds the requirements relating to the specific density award under consideration.

610.6.1 **Development Standards:** Notwithstanding the other provisions of this Section, proposals meeting the following minimum development standards shall qualify for approval or fifty-percent (50%) of the Maximum Project Density calculated above:

610.6.1.1 Occupancy of each unit shall be restricted to persons fifty-five (55) years and older, with the following exceptions:

- 1) An adult over the age of twenty-one (21), if their presence is required to provide medical care to a resident aged fifty-five (55) or older or to the resident's spouse;
- 2) Employees of the housing for older persons project (and family members living in the same unit) who are under fifty (55) years of age, provided the employees perform substantial duties related to the management or maintenance of the project's facilities.

610.6.1.2 Allowable building types may include but are not limited to single detached, duplex, townhouse, or two (2) story garden style apartment units. Each dwelling unit shall have a minimum of 400 square feet of living space. Two-bedroom units shall have a minimum of 600 square feet of living space.

610.6.1.3 No building shall contain more than ten (10) dwelling units, except that the Planning Board may permit more than ten (10) units per building when, in the Board's sole discretion, such increase provides specific, substantial benefits consistent with the purpose and intent of this Ordinance;

610.6.1.4 Where there will be more than one (1) building on a lot, buildings shall have a minimum horizontal separation of thirty-five (35) feet. The Planning Board may require a greater separation where

topography, or other unique characteristics of the site or the development will affect the use of emergency equipment between buildings;

610.6.1.5 Buildings shall be set back a minimum of fifty (50) feet from the nearest lot line;

610.6.1.6 A minimum of sixty-five (65%) of the total area of the development shall be set aside for permanent open space and/or recreational use, and shall be protected by covenants, recorded with the plans, and deed restrictions;

610.6.1.7 All units within a building shall have at-grade or elevator access;

610.6.1.8 No unit shall contain more than two (2) bedrooms;

610.6.1.9 Units may occupy two (2) floors, provided that at least one bedroom and one full bathroom must be situated on the floor containing the principal access and main living area for the unit;

610.6.1.10 All units shall be constructed to be "Adaptable" for accessibility in accordance with Section 610.2.4, above;

610.6.1.11 A minimum of one (1) parking space shall be provided for each bedroom within the proposed development. Said parking shall be provided in close proximity to the units being served;

610.6.1.12 Additional parking for visitors and guests shall be provided as required by the Planning Board, but in no event at a ratio of less than one (1) space for every two (2) dwelling units;

610.6.1.13 All other appropriate provisions of this Ordinance (including Section 704) regarding on-site parking and loading requirements shall apply.

610.6.2 Development Incentives: In addition to meeting the minimum Development Standards delineated above, an Applicant may propose and the Planning Board in its sole discretion may approve additional density awards (expressed as bedrooms) in accordance with the following Development Incentives:

610.6.2.1 Provision of Housing for Older Persons Rental Units - The Planning Board may award a density bonus not to exceed twenty percent (20%) of the Maximum Project Density to an Applicant proposing to set aside and maintain for rental occupancy a minimum of twenty-five percent (25%) of the total units. In approving such an award, the Board shall determine that the covenants or other legal provisions proposed by the Applicant are sufficient to protect and preserve the continued rental occupancy of the units so dedicated;

610.6.2.2 Provision of Affordable Housing for Older Persons Units - The Planning Board may award a density bonus not to exceed fifty percent (50%) of the Maximum Project Density to an Applicant proposing to offer proposed units, of the type(s) permitted in this zone, in conjunction with a local, state or federal government program that is expressly designed and intended to provide and maintain affordable housing

opportunities for older persons, as defined in the local, state or federal program objectives. Density awarded under this provision shall equal the number of bedrooms contained in the units proposed to be constructed under the local state or federal affordable housing for older persons program. In no event shall the density award granted under this provision exceed the award limit of fifty percent (50%) of the Maximum Project Density, as specified above. In approving such an award, the Board shall determine that the Applicant has demonstrated that proper provisions and protections will require that the units be initially offered as, and remain, affordable;

610.6.2.3 Provision of Barrier-Free, Handicapped Accessible Design Features - The Planning Board may award a density bonus not to exceed fifteen percent (15%) of the Maximum Project Density to an Applicant proposing to construct and provide at least fifty percent (50%) of the total units as "Accessible" units in compliance with Section 610.2.4 of this ordinance, and incorporate additional significant and substantial barrier-free features and elements throughout the site's entire design. In approving such an award, the Planning Board shall consider the extent to which the location and nature of the barrier-free features contribute to and enhance the overall livability of the proposed development for older persons with limited mobility or other physical limitations;

610.6.2.4 Provision of On-Site Recreational and/or Common Facilities - The Planning Board may award a density bonus not to exceed fifteen percent (15%) of the Maximum Project Density to an Applicant proposing to include substantial and significant on-site recreational and/or common facilities for the use and enjoyment of project residents. In approving such an award, the Planning Board shall consider the appropriateness of the facilities for the target population; the amount, type, mix, location, quality and convenience of the proposed facilities. The Applicant shall be required to submit a Recreation Plan detailing the specific facilities to be provided - which shall include indoor, outdoor, passive, and active amenities - to aid the Board in determining whether the intent of this award has been met.

610.6.3 Nothing herein is intended to require the Planning Board to approve the maximum density award for a minimum proposal by an Applicant. Rather, the Board is encouraged to approve density awards in relation to a proposal's qualitative and/or quantitative performance in achieving the intent of each Development Incentive.

610.6.4 In no event shall the total of all density awards approved for a given site or project exceed the Maximum Project Density as calculated under Section 610.5.1, above.

610.7 Design Standards: Any project proposed under this Housing for Older Persons Ordinance shall be required to conform to the requirements of the Town of Windham Site Plan Regulations.

610.8 Additional Criteria for Approval:

610.8.1 The Applicant shall be required to demonstrate the provision of significant facilities and services specifically designed to meet the physical and social needs of older persons, OR if the provision of such facilities and services is not practicable, that the proposed housing for older persons is necessary to provide important housing opportunities for

older persons. Consideration of "significant services and facilities" shall include, but shall not be limited to:

- 1) Programs designed to provide a social life for residents;
- 2) Continuing education programs of interest to residents;
- 3) Information and counseling services;
- 4) Recreational programs;
- 5) Homemaker services;
- 6) Services designed to assist residents with the maintenance and upkeep of the building(s) and grounds;
- 7) An accessible physical environment;
- 8) Emergency and preventative health care programs;
- 9) Congregate dining facilities;
- 10) Transportation to facilitate access to social services;
- 11) Referral Services; and
- 12) Services to encourage/assist residents to use the services and facilities available to them.

In demonstrating that significant services and facilities are provided, it is not required that all of the services listed above are being provided.

It is intended under this Section that the Applicant comply with applicable state/federal law which imposes similar requirements. To the extent that a state/federal regulatory agency concludes that the Applicant has not fully complied with this Section, the Applicant must comply with such state and federal requirements as provided in Section 610.9.2.

610.8.2 Any site on which an housing for older persons project is proposed shall be reviewed with respect to the availability of retail, business, medical, and transportation services, and that the proposed construction and design of the housing for older persons project shall contain the usual amenities and living aids found in housing designed for use by older persons.

610.8.3 That the public interest will be served by the proposal to establish housing for older persons on the site, and the establishment of housing for older persons on the site will not cause a diminution in the property values of surrounding parcels.

610.8.4 That the topography and other characteristics of the site are suitable for the type of development being proposed, and conflicts with the character of adjacent neighborhoods will be minimal.

610.8.5 The design and layout of the development shall emphasize the rural character of the Town, maximize the privacy of the dwelling units, preserve the natural character of land, and consider such factors as orientation, energy usage, views, etc.

610.9 Other Provisions:

610.9.1 Limitation on Number of Housing for Older Persons Units: The Planning Board shall not accept for consideration any proposal which, if approved, would increase the total number of all housing for older persons units, existing and proposed, above the number representing ten-percent

(10%) of the total number of dwelling units within the Town as determined by the Tax Assessor.

610.9.2 Interpretation: To the extent that the specific requirements of this Housing for Older Persons Ordinance are inconsistent or at variance with any other requirements contained in the Zoning Ordinance, the requirements imposed herein shall govern and control an Housing for Older Persons proposal. To the extent that specific requirements imposed herein are inconsistent with or at variance with the requirements of the State of New Hampshire or the requirements of the Federal Government with respect to the operation or construction of an housing for older persons project, such State or Federal requirements shall supercede the requirements of this Ordinance.

610.9.3 Legal Documents Required: The Planning Board shall require such covenants or legal restrictions that it deems necessary to insure the intent of this ordinance. The Planning Board may, as appropriate, require review and approval of any such documents by legal counsel to insure that the form and substance of such documents is sufficient to achieve and preserve the requirements of this Ordinance. The provision and review of any documents required hereunder shall be at the Applicant's expense.

610.9.3.1 Assurances of Senior Residency: The Applicant shall provide deed restrictions, use limitations, covenants, or some other legally enforceable instrument, which shall permanently restrict occupancy of the housing facilities to persons who meet all applicable restrictions regarding age. The language of the restrictions and/or limitations must be specific and must correlate with current federal and state requirements for housing for older persons under the Federal Fair Housing Act. Said assurances shall include provisions for:

- The publication of, and adherence to, policies and procedures which demonstrate an intent by the owner(s) or manager(s) to provide housing for persons fifty-five (55) years of age or older; and
- Annual verification of compliance with the age restrictions by reliable surveys and affidavits. Notice of the results of the annual verification process is to be provided to the Code Enforcement Administrator.

610.9.3.2 Assurances Against Exportation of Water: Deed restrictions, covenants, or other reasonable assurances shall be required to insure that water extracted from any site(s) shall remain on-site.

610.9.4 Performance Guarantees Required: The Planning Board may require that a performance bond and/or such other legal assurances be submitted as are required to insure the completion of streets, buffers, amenities, or common area improvements, in accordance with the approved plans and the Subdivision and Site Plan Regulations of the Town of Windham.

611. Open Space Residential Overlay District: Developments under this ordinance would be allowed in the Residential and Rural Districts.

611.1 Authority And Purpose: This section is enacted in accordance with the provisions of RSA 674:21. The purpose of the Open Space Overlay District is to encourage flexibility in the design and development of land in order to provide for the conservation of open space, to plan for a more efficient use

of Town services, and to promote the development of balanced residential communities in harmony with natural land features.

611.2 Objectives: The objectives of this Section are to:

611.2.1 Preserve open space, forests, farms, orchards and wetlands;

611.2.2 Maintain or decrease existing residential densities allowing the same or fewer homes per development;

611.2.3 Promote the more efficient use of land by requiring shorter networks of streets and utilities thus saving the town the expense of additional infrastructure;

611.2.4 Provide an organized procedure which can allow appropriate, high quality design and site planning.

611.3 Definitions: The following definitions specifically apply to this Section of the Zoning Ordinance:

Open Space Residential Development: A minimum ten (10) acre tract of single or consolidated ownership, where a number of single family structures may be grouped together with minimum lot area, frontage and yard requirements as specified in this section of the ordinance. The density of the tract as a whole shall be equal to that density achieved by using soil type lot size requirements as described in the Windham Zoning Ordinance. The remaining area in the tract, not built upon, is reserved as open space and permanently protected from further subdivision and development.

Tract: One (1) or more adjacent lots. For the purpose of this definition, lots shall be considered adjacent, notwithstanding the fact they are separated by a brook, stream, or river; a public road or right of way (except the Interstate Highway); a railroad right of way; or by a private access way. The lots shall be merged into a single lot as a condition of approval under the Open Space Residential Overlay District.

611.4 Open Space: Land that is not currently developed for residential tract development which is to be maintained in an open, non-built condition, and shall be protected by covenants recorded with the plans and deed restrictions.

Common Facilities: Land or built facilities which are commonly owned by the property owners of the development. Common facilities may be proposed, but are not required. This may include wells, water and waste treatment systems and recreation areas.

611.5 Procedures: Review Process: An open space development shall require both subdivision and site plan approvals, which should be concurrent, and whose processes shall be as described by current subdivision and site plan regulations, except as noted below:

611.5.1 Any required legal open space ownership and protection covenants or cooperative open space ownership and protection agreements or similar forms of land protection and ownership shall be reviewed by Town Counsel to ensure legal form, ownership and enforceability.

611.5.2 The site plan shall show the location of proposed buildings, common facilities, if any, and other development, as well as the remaining open space. The plan shall also indicate the natural features of the open space, such as open fields, water features, woodlands, wetlands, trails, stone walls, and historic features, as well as any proposed modifications to that open space.

611.5.3 The subdivision and site plan shall show the layout of all roads and shall differentiate between primary roads which move traffic through the development and secondary roads which provide access to the development and dwelling units. It is intended that all roads will be public roads.

611.5.4 Density: The number of lots allowed in a subdivision under this ordinance would be calculated by the procedure outlined below but in no case would the number of lots allowed under this ordinance exceed the number of lots under a traditional subdivision.

611.5.4.1 Determine the number of lots by soil type lot size requirements per ordinance. This figure will be the maximum number of lots possible.

611.6 Development Standards: Development standards shall be as prescribed in the Windham subdivision control and site plan regulations, except as noted below:

611.6.1 Permitted Uses: All uses allowed in the underlying district .

611.6.2 Secondary Roads: Roads which are not usually "through streets" but are used exclusively for access to abutting properties:

611.6.2.1 Secondary Roads may be ended in a turnaround, with maximum road length in accordance with current subdivision regulations and a turnaround configuration in accordance with current subdivision regulations. The turnaround radius may be reduced to sixty (60) feet without a vegetated island by the Planning Board using the standards for a waiver regulation if it can be demonstrated that the small radius significantly reduces impacts to wetlands, the Wetlands Watershed Protection District (WWPD), or reduces excessive blasting or fill.

611.6.2.2 Secondary roads shall have a minimum paved width of twenty-four feet (24').

611.6.2.3 All other road construction standards shall be the same as for collector roads.

611.6.3 Collector Roads: Roads which act as "through streets" which connect to different existing public right-of-ways. Collector roads shall have minimum right-of-way and a minimum paved width in accordance with current subdivision regulations.

611.6.4 Minimum Building Lot Size: The minimum lot size shall be 30,000 sq. ft. with a minimum buildable area of 10,000 sq. ft.

611.6.5 Frontage and Yard Regulations: Structures may be located in any manner on the site which meet this district's objectives, and provided that the following dimensional standards are met:

611.6.5.1 On Existing Town Roads: Building lots within the project that face on existing Town roads shall have frontages and front yard and side yard, but not area and rear yard, requirements as prescribed for the underlying district.

611.6.5.2 At Adjacent Properties: Building lots within the project that back up to other properties shall have rear yard and side yard, but not frontage, front yard or area, requirements as required for the underlying district.

611.6.5.3 Internal Dimensional Requirements: The following minimal dimensions shall apply for the layout of the structures within the parcel:

611.6.5.3.1 Front yard setback - twenty feet (20') from the edge of the right of way.

611.6.5.3.2 Frontage - sixty feet (60') at the required front yard setback.

611.6.5.3.3 Structures shall be set back at least fifteen feet (15') from side and rear lot lines.

611.6.6 Water and Waste Treatment Systems: The development may be served by common water and waste water systems. Wells and waste water systems may be located within the open space and shall have a protective radius as required by the New Hampshire Water Supply and Pollution Control Commission or the Town of Windham. Such radius shall be wholly contained within the subdivision. Any waste water treatment system or backup system shall have appropriate state approval.

611.6.7 Open Space:

611.6.7.1 Permanent Open Space: A minimum of sixty-five percent (65%) of the total area of the development shall be set aside as permanent open space.

611.6.7.2 Use of Open Space: Such land shall be restricted to open space recreational uses such as nature trails, residential agricultural use, passive recreation, conservation lands, water supplies and waste treatment systems, and existing agricultural uses.

612. Village Center District

612.1 Purpose: To preserve the area around the Town Hall, the Fire Station, the Armstrong Building, the Bartlett Buildings and the Historic District as the traditional and actual Town Center. The purpose of this ordinance is to establish special conditions which when satisfied would allow through design guidelines, mixed uses of retail, professional offices, and residential in the Town Center. This district would minimize sprawl along road corridors by providing an off road village center that would preserve the Town Center.

612.2 Uses Permitted: Subject to Site Plan approval as provided in the Windham Site Plan Regulations: Small retail shops, not larger than ten thousand (10,000) square feet, eating and drinking establishments where consumption is primarily intended to be on the premises, professional offices, schools, banks, bakeries, civic, public, institutional facilities, medical offices, clinics, single and townhouse residential uses and personal services, such as, hairdressers.

612.3 Development Standards: Development standards shall be prescribed in the Site Plan Regulations. Additional development standards are as follows:

612.3.1 There shall be a minimum fifty feet (50') natural buffer of vegetation supplemented by evergreen trees and landscaped berms from the residential district and uses;

612.3.2 Shared parking facilities and driveways shall be provided and the parking space requirements reduced where shared parking is designed to maximize complimentary uses and it has been demonstrated to the Planning Board that sufficient parking will be available when it is needed;

612.3.3 There shall be no front, side or rear setback requirements except that there shall be a 50 foot setback from Route 111 Right of Way;

612.3.4 The road frontage requirements shall be fifty (50) feet at the front lot line;

612.3.5 Town roads in this district would be designed for low speed travel and therefore would be encouraged to be built narrower than the normal town standards;

612.3.6 Existing buildings, with historical significance, as recommended by the Heritage Commission, should be preserved and reused for allowed uses with shared parking and driveways. Shared parking would be located to minimize its visual impact in order to preserve the village character;

612.3.7 Buildings shall be designed and sited to maintain views and vistas;

612.3.8 Public space or open square for outdoor activities, including pedestrian walkways shall be provided;

612.3.9 There shall be no minimum lot size;

612.3.10 The recommended district land use mix in total build out occupiable square footage is 40% retail and service uses, 40% offices and 20% residential. The Planning Board will review each proposal for compliance with the recommended land use mix and the district purpose.

613. Public Utility Structures: Public utility structures and buildings, not exceeding 500 square feet and 20 feet in height in size shall be allowed in any district, subject to site plan review and approval by the Windham Planning Board. This would not include commercial antenna structures regulated elsewhere in section 701.3.

614. Professional, Business, and Technology District:

614.1 Purpose: This district is intended for use by research laboratories, office buildings, and light industries that are compatible with a low density, low traffic generation, rural residential community.

614.2 Uses Permitted: Subject to Site Plan Approval as provided in the Windham Site Plan Regulations.

614.2.1 Professional and business offices and services, including but not limited to legal and other professional services, finance, insurance, real estate offices, banks and medical offices;

614.2.2 Medical or dental laboratories;

614.2.3 Private schools or colleges without dormitory facilities;

614.2.4 Health and fitness clubs;

614.2.5 Research laboratories and office buildings;

614.2.6 Printing or publishing shops;

614.2.7 Passenger depots, terminals and utility structures;

614.2.8 Telephone exchange buildings, radio stations, television stations and towers subject to the provisions of Section 701.3;

614.2.9 Manufacturing;

614.2.10 Retail sales of merchandise that is manufactured or assembled on site, provided that the sales area is limited to no more than 33% of the building's total area;

614.2.11 Wholesale distribution centers with less than 66% warehousing;

614.2.12 Eating and drinking establishments, when consumption is primarily intended to be on the premise;

614.2.13 Newsstands, barbershops, dining rooms, luncheonettes, cafeterias, delicatessens, mechanical and/or electronic amusement devices, child care facilities and similar accessory services primarily for occupants or users thereof within an office or industrial building;

614.2.14 Off-street parking subject to the provisions of Section 704;

614.2.15 Signs as provided in Section 706;

614.2.16 Accessory buildings and uses.

614.2 Development Standards: Development Standards shall be prescribed in the Table of Requirements, the Site Plan Regulations and the following additional requirements

614.2.1 There shall be a minimum fifty feet (50') natural buffer of vegetation supplemented by evergreen trees and landscaped berms from the residential district and uses;

614.2.2 Shared parking facilities and driveways shall be provided and the parking space requirements reduced where shared parking is designed to maximize complimentary uses and it has been demonstrated to the Planning Board that sufficient parking will be available when it is needed;

614.2.3 Public space or Open space for outdoor activities, including pedestrian walkways shall be provided;

614.2.4 "The Conditions of Approvals" for buildings in the Limited/Industrial District contained in Section 606.2 shall apply in all appropriate circumstances.

615. Route 28 Access Management Overlay District:

615.1 **Authority and Purpose:** This Ordinance, adopted pursuant to the authority of RSA 674:16 and RSA 674:21, shall be known as the Route 28 Access Management Overlay District Ordinance. The regulations in this ordinance shall overlay and supplement the regulations in the *Town of Windham Zoning Ordinance and Land Use Regulations*, and shall be part of the Zoning Ordinance for purposes of administration and appeals under state law. If any provision of this ordinance differs or appears to conflict with any provision of the Zoning Ordinance or other ordinance or regulation, the provision imposing the greater restriction or more stringent standard shall apply. The purpose of this ordinance is to:

Provide safe access to land development while conserving Route 28, Rockingham Road's ability to move traffic safely and efficiently;

Provide reductions in accident costs;

Maintain the efficient movement of people and goods;

Preserve the public investment in the transportation infrastructure;

Reduce the need to build new roadways and driveways;

Protect the value of private investments;

Enhance the environmental and economic vitality of Route 28.

615.2 Objectives:

Limit the number of conflict points. The more conflict points that occur at an intersection the higher the potential for vehicular accidents. When left turns and cross street through movements are restricted, the number of conflict points is significantly reduced.

Separate conflict areas. Intersections created by public streets and driveways represent basic conflict areas. Adequate spacing between

intersections allows drivers to react to one intersection at a time, and reduces the potential for conflicts.

Reduce the interference of through traffic. Through traffic often needs to slow down for vehicles exiting, entering, or turning across the roadway. Providing turning lanes, designing driveways with large turning radii, and restricting turning movements in and out of driveways allows turning traffic to get out of the way of the following through traffic.

Provide sufficient spacing for at-grade signalized intersections. Good spacing of intersections reduces conflict areas and increases the potential for smooth traffic progression.

Minimize signalized intersections.

Minimize visual driver distractions by maintaining natural and planted landscaped buffers along the Route 28 corridor.

Provide adequate on-site circulation and storage. The design of good internal vehicle circulation in parking areas and on local streets reduces the number of driveways that businesses need for access to the major roadway.

615.3 Definitions:

Service Road - A road located off the arterial, which provides access to properties that front on this road, instead of directly accessing the arterial.

615.4 Location:

The overlay area shall be located as follows: Starting at the Derry town line south along the east and west sides of Route 28, one thousand feet from the centerline of Route 28 to Jones Road. South of Jones Road, the overlay district shall follow the Manchester and Lawrence Railroad bed to the Salem town line on the west, and Harris Road to the Salem town line on the east.

615.5 Allowed Uses:

All uses allowed in the underlying districts are allowed in the overlay district. For new construction, reconstruction, and new uses, see *Section 500*.

615.6 Development Standards: Development standards shall be as prescribed in the Subdivision Control and Site Plan Regulations, except as noted below:

615.6.1 The minimum frontage requirements for lots with frontage only on Route 28 shall be two hundred and fifty (250) feet.

615.6.2 Front Yard Setback, Natural Buffer Area:

The minimum front yard building setback for lots with frontage only on Route 28 shall be fifty (50) feet, which shall be left wooded and in its natural state. Where such area is not naturally wooded, it shall be suitably landscaped with a sufficient number of trees of a type common in Windham to constitute a visual barrier between the proposed development and the roadway. Under no circumstances will parking, retention ponds, or any other development involving clearance of natural vegetation be permitted within said area, except for permitted signs and allowed access driveways. Nothing herein is intended to prohibit

appropriate tree surgery or similar maintenance of vegetation in this buffer area. Lots with frontage on both Route 28 and an adjacent or intersecting road shall also be required to provide the fifty (50) foot natural buffer along Route 28. The fifty-foot natural buffer shall not apply to lots zoned Neighborhood Business or Business Commercial A.

615.6.3 Minimum Distance Between Driveways:

The minimum distance between driveways on the same and opposing sides of Route 28, including all road intersections shall be measured from the centerline of the driveways at the right-of-way line and shall be a function of the posted speed in accordance with the following table:

MINIMUM DISTANCE BETWEEN DRIVEWAYS

Posted Speed (mph)	Minimum Spacing
35	150'
40	185'
45	230'
50	275'

Where opposing sides of a road have different speed limits, the higher speed limit shall prevail. The centerlines of all new service roads and driveways should be aligned with driveways, and road intersections on the opposing side of the highway, if they exist. If such an alignment is not feasible, the driveways shall be offset in accordance with the above table.

615.6.4 Driveway Width:

Non-residential driveways shall not exceed twenty-four (24) feet in width for two lanes or thirty-six (36) feet in width for three lanes, measured perpendicular to the driveway at its narrowest point. The driveway shall be flared at the property line with minimum radii of twenty-five (25) feet.

615.6.5 Maximum Number of Driveways Per Lot:

Lots, which only have frontage on Route 28, shall be allowed a single driveway, unless demonstrated to the Planning Board that additional driveways are required for safety and/or traffic flow. Two, one-way driveways may be substituted for a single driveway, provided that the minimum required distance between driveways can be met, *Section 615.6.3*.

615.6.6 Driveway (Throat) Length:

The minimum length of a driveway shall be of adequate length to accommodate the safe queuing of vehicles. The design of the driveway shall, to the maximum extent possible, cause no vehicles waiting to enter the site, to remain on the highway and to allow for safe ingress and egress to the property. The loading or unloading of delivery vehicles along the Route 28 right-of-way shall not be allowed.

615.6.7 Shared Parking Facilities and Driveways:

Shared parking facilities and driveways shall be provided where feasible and the parking space requirements reduced where shared parking is designed to maximize complimentary use and it has been demonstrated to

the Planning Board that sufficient parking will be available when it is needed.

615.6.8 Interconnecting Driveways:

All projects subject to site plan review shall provide interconnecting driveways or easements for future construction of driveways that will provide and promote vehicular and pedestrian access between adjacent lots, without accessing the highway to all property lines, and shall be designed to provide safe and controlled access to adjacent developments where they exist.

615.6.9 Access to Lots with Multiple Frontages:

Lots with frontage on both Route 28 and a service or intersecting road shall not be permitted to access Route 28, except where it can be demonstrated to the Planning Board that other potential access points would cause greater environmental, safety, or traffic impacts.

615.6.10 Service Roads:

Service roads shall be utilized, whenever possible, for direct access to permitted uses on properties. New driveways and roads shall be located to maximize access to surrounding properties.

615.7 Administration: The Route 28 Access Management Overlay District shall be administered by the Planning Board through its Subdivision Control and Site Plan Regulations.

SECTION 700 - DEVELOPMENT OF SITES AND LOCATION OF BUILDINGS AND STRUCTURES

701. Height Regulations:

701.1 The height of any occupiable space in any building shall not exceed thirty-five (35) feet except that in no case shall the height in an airport approach zone established by the New Hampshire Aeronautics Commission exceed the height limit established by said commission.

701.2 Limitations of height shall not apply to spires, domes, steeples, chimneys, bulkheads, cooling towers, ventilators, and other appurtenances usually carried above the roof, or to farm buildings, churches, municipal buildings, provided that if the use requires a permit one has been granted.

701.3 Commercial antenna structures are permitted in all commercial zones subject to the following:

701.3.1 Tower height shall not exceed in height the distance to the nearest lot line or 150 feet, whichever is the lesser.

701.3.2 The maximum plan view area of antenna structure shall be one hundred twenty (120) square feet, as measured on maximum plan view.

701.3.3 Guy wires shall not extend into the required building setback areas.

701.3.4 Towers attached, bracketed or mounted on buildings shall not extend more than twenty-five (25) feet above the established roof line.

701.3.5 Only one (1) tower shall be erected on a lot. Towers shall be located at least four thousand (4,000) feet apart, measured in a straight line from the base of each tower.

701.3.6 Towers shall be designed and placed to allow co-location of facilities and uses on each tower.

701.3.7 The total radiation output of all equipment on the tower shall not exceed regulatory limits beyond the lot line.

701.3.8 A site alternative analysis, including existing structures, shall be conducted.

701.3.9 A bond shall be submitted to and held by the Town of Windham for the removal of the commercial antenna structure and tower when the facility is no longer operational.

702. **Area, Frontage, Yard and Floor Area Requirements:** No building or structure shall be erected unless in conformity with the requirements on the Table of Requirements (See Table of Requirements in Appendix A-1), except that:

702.1 Awnings, eaves, sills, steps, cornices, belt cornices, fences or walls, light poles, mailboxes, driveways, stonewalls, retaining walls, walkways, essential utilities, septic systems, cisterns for emergency water supply and similar features may project into or be permitted within the required yards provided in the ordinance.

702.2 On a corner lot, in order to provide visibility unobstructed at intersections, no sign, fence, wall, tree, hedge or other vegetation, and no building or other structure more than three (3) feet above the established street grades measured from a plane through the curb grades on the height of the crown of the street shall be erected, placed or maintained within the area

formed by the intersecting street lines and a straight line joining said street lines at points which are twenty-five (25) feet distant from the point of intersection, measured along said street line.

702.3 Further, no yard, lot area or other open space required for a building or structure by this Ordinance shall, during the existence of such building or structure, be occupied by or counted as open space for another such building or structure. No lot area shall be so reduced or diminished so that the yards or other open space shall be smaller than prescribed by this Ordinance.

702.4 Allowing waivers for pre-existing setback violations: Notwithstanding any other provision contained herein, for any single family or duplex dwelling, originally constructed by a lawfully issued building permit issued prior to January 1, 1980, the Code Enforcement Administrator, or his/her designated agent, may issue an administrative waiver of any setback violations, provided that the waiver may not be issued for any encroachment exceeding ten percent (10%) of the required setback distance. In determining whether to issue such a waiver, the Code Enforcement Administrator shall consider the following factors:

702.4.1 The potential causes for the original non-compliance;

702.4.2 The effect on public health, safety and welfare created by the encroachment;

702.4.3 The effect on non-enforcement of the required provisions on surrounding complying properties;

702.4.4 No approvals may be given for setback encroachments on both of the opposite sides of any structure. If the Code Enforcement Administrator should deny such waiver request, the property owner may file an administrative appeal or such a decision with the Zoning Board of Adjustment, or may alternatively seek a variance from the terms of the underlying setback requirement.

702.5 Non-residential uses of land which abut a residential district or a pre-existing residentially used lot shall provide a fifty (50) foot wide buffer between the use and the district. Said buffer shall include natural or added planting of evergreens which will screen non-residential uses from residential areas during winter months.

702.6 Canopies, whether attached to the principal structure or detached, shall be set back thirty (30) feet from the front property line, twenty (20) feet from the side property line, and thirty (30) feet from the rear property line measured from the edge of the canopy roof.

702.7 Energy or Communications Systems. Wind, solar, hydro and communication structures shall meet the required setbacks for the zoning district at their location.

703. Accessory Buildings & Swimming Pools: A detached accessory building or a swimming pool may be erected in the rear or side yard area in conformance with the yard requirements of the district in which it is located. An accessory building attached to its principle building shall be considered an integral part thereof and as such shall be subject to the front, side, and rear yard requirements applicable to the principle building.

704. Off-Street Parking and Loading Areas:

704.1 Off-street parking and loading spaces shall be required as follows:

Section 700:2

- 704.1.1 Dwellings: One (1) parking space for each dwelling unit therein and sufficient off-street parking for visitors and employees.
- 704.1.2 Places of public assembly: One (1) parking space for each three (3) seats therein or one (1) space for each sixty inches (60") of bleachers or benches, plus one (1) space for every two (2) employees thereon.
- 704.1.3 Schools: One (1) parking space for each classroom and office therein, plus one (1) parking space for each three (3) seats in the auditorium thereof.
- 704.1.4 Hotels, motels and other places providing overnight accommodations: One (1) parking space for each room accommodation therein, plus one (1) space for each two (2) employees and adequate spaces for delivery vehicles.
- 704.1.5 Restaurants: one (1) parking space for every 2.5 seats in the restaurant seating area and one parking space for every two (2) seats in the lounge area including tables, stools or chairs at the bar plus one (1) parking space for each employee on the largest shift and adequate spaces for delivery vehicles.
- 704.1.6 Retail and service establishments: one (1) space per two hundred (200) square feet of gross floor area.
- 704.1.7 Retail sales of automobiles, nursery stock and such other goods as usually involve extensive display areas in relation to customer traffic: One (1) space for each five hundred (500) square feet of gross floor area.
- 704.1.8 Business, Professional and administrative offices: One (1) space for each two hundred fifty (250) square feet of gross floor area.
- 704.1.9 Lab and Manufacturing: One (1) space for each three hundred (300) square feet of usable floor area.
- 704.1.10 Wholesale, storage, warehousing or similar service uses: One (1) space for each six hundred (600) square feet of useable floor area.
- 704.1.11 Miscellaneous use determined by the Code Enforcement Administrator prior to the issuance of a building permit on advice of the Planning Board.
- 704.1.12 The number of parking spaces required by this section may be reduced upon written determination of the Code Enforcement Administrator, based on the Planning Board's written recommendation to him/her following it's site plan review, that special circumstances render a lesser number of spaces adequate for all parking needs. In order to qualify for a reduction, the petitioner must present a site plan showing that all parking spaces needed to meet the requirements of this section could be built on site. Those spaces to be waived shall be marked on the plan as "Reserve Parking Area(s)" on the Planning Board's written decision to grant a reduction. The "Reserve Parking Area(s)" are to be maintained as landscaped areas unless and until construction of additional parking spaces is required by the Planning Board. No building, other than parking spaces shall ever be allowed in this area.
- 704.1.13 All parking calculations shall be rounded up to the next whole number.

704.2 Design of Off-Street Parking and Loading Spaces:

- 704.2.1 For all required off-street parking spaces, open or enclosed, each

three hundred (300) square feet of net standing and maneuvering area shall be considered one (1) space. However, if such spaces are located in a completely enclosed building, each two hundred and fifty (250) square feet of net standing and maneuvering area shall be considered one (1) space. All required parking spaces shall be provided with unobstructed access to and from a street and shall be properly maintained in such a manner as to permit them to be used at all times. All required parking spaces shall be located on the same lot as the use with which such spaces are connected or in the case of unenclosed spaces, within two hundred feet (200') of the lot, except that two (2) or more businesses may jointly provide the required spaces on one (1) or more of their lots. The number of spaces in any such joint facility shall at least equal the total number required under the provisions of this Section for their individual uses.

704.2.2 All off-street parking and loading areas, permitted and/or required, except for dwellings, which are located within or adjacent to the Rural or Residence District (whether on the side or rear) shall be screened from all adjoining lots in said district by either:

704.2.2.1 A minimum ten (10) feet landscaped buffer area with planting of evergreens measuring at least four (4) feet high at time of planting and which may be expected to form a six (6) foot high screen within three years, the entire length of the buffer area to be 80% or more opaque when viewed horizontally;

704.2.2.2 or a solid fence, six (6) feet in height with twenty percent (20%) or more of the fence face planted with evergreens, such screening to be compatible with the character of the neighborhood. This screen shall be located on a minimum of ten feet (10') landscaped buffer.

704.2.3 Required off-street parking and loading spaces shall not hereafter be reduced.

704.2.4 Required off-street parking and loading spaces shall have adequate vehicular access to the street, which along with the areas themselves, must be approved on a Site Plan in the case of business or industrial uses; see Windham Site Plan Regulations.

704.2.5 Except in the case of parking spaces provided for dwellings, off-street parking and loading areas shall be paved to specifications prepared by the Planning Board with the advice of the Town Engineer.

704.2.6 Except in the case of parking spaces provided for dwellings, off-street parking and loading areas used after sundown shall be illuminated, with illumination so arranged as not to shine on abutting properties or on streets.

704.2.7 With the exception of those parking areas provided for single-family dwellings, off-street parking and loading areas shall be located a minimum of ten (10) feet from side and rear property lines, and twenty (20) feet from the property line along a public way.

704.2.8 Dimensions: Except for parking for single family dwelling maneuvering aisles shall be laid out in compliance with the minimum dimensions set forth in the following table:

MINIMUM PARKING SPACE & AISLE DIMENSION FOR PARKING AREAS (in feet)			
<u>Angle of</u> <u>Parking</u>	<u>Width of</u> <u>Parking Space</u>	<u>Depth of</u> <u>Parking Space</u>	<u>Width of</u> <u>Maneuvering Aisle</u>

61 to 90 degrees	9'	18'	24'
46 to 60 degrees	9'	18'	18'
45 degrees	9'	18'	15'
Parallel*	8'	22'	14' (1-way) 20' (2-way)

*To be counted as a required parking space, a parallel parking space shall have a maneuvering space at least 20' deep adjacent to an aisle parallel to and abutting such parking space

Parking areas where the parking spaces are angled at 45 or 60 degrees shall have one way traffic circulation.

704.2.9 All required parking spaces (except on single family dwelling lots) shall be marked to provide delineation between parking stalls and aisles.

704.2.10 In off-street parking areas for 50 or more vehicles each parking area shall have interior landscaping areas, primarily planted with trees, equivalent in size to five (5) percent of that parking area's total pavement area. There shall be no more than 30 spaces in any uninterrupted row. One live shade tree or ornamental tree is required for each two thousand (2,000) square feet of parking area.

704.2.11 Curbing: Where landscaped areas abut parking areas and/or driveways, the landscaped areas shall be protected from vehicular encroachment by curbs or berms.

704.3 Vehicular parking handicap:

704.3.1 Location:

704.3.1.1 Specially designated parking spaces for the physically handicapped shall be located closest to the designated accessible primary entrance (s).

704.3.1.2 If possible, they shall be located so that handicapped persons do not have to cross a roadway or traffic land.

704.3.1.3 In multilevel garages where not elevator is provided such spaces shall be located near the accessible entrance.

704.3.2 Number of Such Spaces Shall Be Provided as Follows:

TOTAL SPACES	REQUIRED SPACES
1-40	5% BUT NOT LESS THAN 2 SPACES
41-100	4% BUT NOT LESS THAN 3 SPACES
101-200	3% BUT NOT LESS THAN 4 SPACES
201-500	2% BUT NOT LESS THAN 6 SPACES
501-1,000	1.5% BUT NOT LESS THAN 10 SPACES
1,001-2,000	1% BUT NOT LESS THAN 10 SPACES
2,001-5,000	.75% BUT NOT LESS THAN 20 SPACES
5,001-	.50% BUT NOT LESS THAN 30 SPACES

704.3.3 Width:

704.3.3.1 Such parking spaces which are perpendicular or diagonal to the parking roadway shall be 12'-0" (3.65m) wide. Spaces shall allow persons in wheelchairs to enter or leave an automobile on a uniform surface suitable for wheeling or walking.

704.3.3.2 Two 8' (2.44m) wide spaces, separated by a 8' (2.44m) center

aisle, which is painted or striped yellow, can be used as an alternative.

704.3.4 Identification:

704.3.4.1 Such spaces shall be identified by a sign at each space or pair of spaces stating that these spaces are reserved for the physically handicapped.

704.3.4.2 This sign shall be located a height not less than 5'-0" (1.5m) and not more than 8'-0" (2.44m)

704.3.4.3 The sign shall contain the "International Symbol of Access" as shown in Han 412.

704.3.5 Parking Surface Area:

704.3.5.1 Parking surface areas required to be accessible for the handicapped shall not slope more than one-in-twenty.

704.3.5.2 Catch basins and drainage patterns shall not interfere with travel for handicapped persons.

704.3.6 Sidewalks:

704.3.6.1 Where sidewalks are provided at such spaces, a curb cut (sidewalk ramp) shall be installed at each specially designated space or pair of spaces, so that handicapped persons are not required to enter the stream of traffic to attain access to sidewalks.

704.3.6.2 If the alternative described in Section 704.3.3.2 is used, the curb cuts shall be installed where the center aisle meets the sidewalks.

704.3.7 Walks and Ramps:

704.3.7.1 Walks and ramps required as a means of egress leading from specially designated parking spaces for the handicapped in parking lots, garages or other parking facilities shall be in conformity with all sections of the code.

704.4 Limitations on Parking:

704.4.1 Outdoor parking of more than one (1) unregistered and uninspected motor vehicle on any lot shall be prohibited in all districts. There shall be no parking of unregistered or uninspected vehicles in the required side yard, front or rear setbacks.

704.4.2 Parking of any unregistered and uninspected motor vehicles on vacant lots, or on Town property, easements or rights-of-way shall be prohibited in all districts.

704.4.3 Prohibitions on parking unregistered and uninspected vehicles shall not apply to vehicles in a condition for and offered for sale from retail sales lots approved by the Planning Board, or in existence prior to site plan jurisdiction having been granted to the Planning Board, or to junk yards holding licenses issued by the State of New Hampshire, and likewise approved by the Planning Board or pre-existing.

704.4.4 Parking spaces at gasoline dispensers may be counted as required parking when there is only a convenience store on site.

705. Open Space and Landscaping Requirements:

705.1 The following requirements shall be met: (Except for those lots within the Rural or Residential Districts or where open space requirements are more restrictive elsewhere in this ordinance) or in the Village Center District where open space and landscaping requirements are outlined in the Site Plan Regulations.

705.1.1 Open Space: A minimum of 30% of any total lot area shall be maintained as open space. Any non-permeable areas such as paved surfaces and building ground floor areas shall be excluded from this space area calculation.

705.1.2 Any disturbed natural area shall be properly landscaped with grass, trees, shrubs, ground cover, mulch or a combination of any of these elements. In no case will mulch alone be acceptable.

705.1.3 No landscaped area shall be less than five (5) feet wide, except at a building perimeter, in which case three (3) feet is acceptable.

705.1.4 A properly landscaped area must be provided within twenty-five (25) feet of any building perimeter (except at loading areas, and along service access drives in the rear of any building not facing a public way).

705.1.5 A landscape plan must be submitted along with the site development for approval to the Planning Board. This plan shall identify all landscaped areas and define the intent of the proposed landscaping by identifying the general types and locations of plantings.

705.1.6 Landscaping shall comply with the following general specifications:

705.1.6.1 Deciduous trees shall not be less than two and one half (2 1/2) inches caliper.

705.1.6.2 Evergreen trees shall not be less than four (4) feet tall.

705.1.6.3 Shrubs shall not be less than eighteen (18) inches high.

705.1.6.4 All proposed plantings shall be appropriate for the soils and weather conditions of the specific site.

705.2 Definition:

705.2.1 Usable Floor Area: The sum of the area (s) of one or several floors of a building as measured by the exterior walls, excluding:

705.2.1.1 Stairhalls, toilet rooms, enclosed hallways, enclosed lobbies, and other areas specifically defined as common use areas and physically identified by partitions or walls

705.2.1.2 Accessory garage areas, accessory to the operation of the building itself

705.2.1.3 Areas devoted to the operation of the building, housing heat, ventilation and air conditioning equipment.

706. Sign Regulations:

706.1 Intent: This article is adopted for the regulation and restriction of signs within the Town of Windham in order to protect and enhance the visual environment of the Town and the safety, convenience and welfare of its residents.

706.2 Construction--All Districts: Plans and specifications must be submitted

to the Building Inspector ten (10) days prior to Site Plan review by the Planning Board. In the event that Site Plan review is not required, the reviewing agency will be the Building Department. Materials and construction methods must conform to the most recently adopted Building Code.

706.3 Definitions:

Awning Sign: Any visual message incorporated into an awning attached to a building.

Changeable Copy Sign: A sign on which the visual message may be periodically changed no more frequently than once per day. (Example: Reader boards)

Clear Sight Triangle: The area defined in Section 702.2.

Complex: Either commercial or industrial structure(s) with two or more tenant spaces or divisions.

Directional Sign: A sign limited to providing directional or guide information on the most direct or simple route for on-site public safety and convenience. Directional signs may be located adjacent to driveways. Examples: "IN", "OUT", "ENTRANCE", "EXIT", and "PARKING".

Freestanding Sign: Any sign supported by structures or supports that are placed on, or anchored in, the ground and that are independent from any building or other structure.

Illuminated Sign: Any sign illuminated by electricity, gas or other artificial light either from the interior or exterior of the sign and which includes reflective and/or phosphorescent surfaces.

Projecting Sign: Any sign affixed to a building or wall in such a manner that its leading edge extends more than six inches beyond the surface of such building or wall.

Roof line: Shall be the lower border of a roof that overhangs the wall (the projecting edge of the roof).

Sign: As defined in Section 200 of this Ordinance.

Sign area: Shall be that contiguous area of the sign that could be used to communicate visually the advertised message.

Unit: shall consist of only one primary structure per lot with one and only one tenant space.

Wall Sign: Any sign attached parallel to, but within six inches of, a wall, painted on the wall surface, or erected and confined within the limits of an outside wall of any building or structure, which is supported by such wall or building, and which displays only one sign surface.

706.4 Zones: Sign Usage Allowed: Refer to Section 706.6 "Sign Specifications By District" table for maximum allowable number and dimensions of signs permitted in any zoning district, subject to Site Plan Review. Other requirements, as applicable, are noted herein.

706.4.1 Residence "A" District: A permanent sign shall be allowed to identify the name and address of the residential occupant; such sign shall not be subject to Site Plan Review, and shall not be internally illuminated. All other signs shall be subject to Site Plan Review.

706.4.2 Residence "B" District: A permanent sign shall be allowed to identify the name and address of the structure's residential occupants; such

sign shall not be subject to Site Plan Review, and shall not be internally illuminated. All other signs shall be subject to Site Plan Review.

706.4.3 Residence "C" District: Same as Rural.

706.4.4 Rural District: For single-family homes, a permanent sign shall be allowed to identify the name and address of the residential occupants of the premises. Such sign shall not be subject to Site Plan Review, and shall not be internally illuminated. All other signs shall be subject to Site Plan Review.

706.4.5 Commercial A and B Districts: In these districts, one freestanding sign identifying the commercial complex or unit shall be allowed. If a common back plate is used for support, it shall not exceed one and one half times the area of said occupants' signs. A sign is permitted on the façade of each tenant space. Buildings fronting more than one right-of-way may not combine the permissible sign square footage for the purpose of placing one sign on one frontage.

706.4.6 Gateway Commercial District: Same as Commercial Districts.

706.4.7 Limited Industrial District: Same as Commercial Districts.

706.4.8 Professional, Business and Technology District: Same as Commercial Districts.

706.4.9 Neighborhood Business District: In this district, one freestanding sign identifying the Neighborhood Business complex or unit shall be allowed. A sign is permitted on the façade of the building. A building fronting more than one right-of-way may not combine the total permissible sign square footage for the purpose of placing one sign on one frontage. In a Neighborhood Business complex, a sign shall be permitted on the façade of each tenant space.

706.4.10 Historic District and Village Center District: The intent of this section is to ensure the appropriateness of the placement, design, size, color, and execution of signs within the Historic and Village Center District so that they are visually compatible with the structures and environs.

706.4.10.1 Application:

A. **Historic District:** Any proposed sign, sign structure, or change to an existing sign (but not contents of normally changeable copy) is subject to approval by the Historic District Commission.

B. **Village Center District:** Any proposed sign, sign structure, or change to an existing sign (but not contents of normally changeable copy) must be reviewed for comments by the Historic District Commission.

706.4.10.2 Signage Details: Dark backgrounds with light colored lettering are encouraged. Fluorescent or glowing colors are prohibited. Signs shall not obscure important architectural details or features such as windows, transom panels, sills, moldings, cornices, and the like. Signs on adjacent storefronts within the same building shall be coordinated in design, height, and proportion.

706.4.10.3 Illumination: In addition to lighting restrictions detailed

elsewhere in the ordinance, no internally lit signs are permitted.

706.5 General Sign Regulations--All Districts:

706.5.1 No sign shall extend above the roof line of the building to which it is attached. Roof signs are not allowed.

706.5.2 Any traffic or directional sign owned or installed by a governmental agency shall be permitted.

706.5.3 (Temporary) signs tacked, nailed, posted, or otherwise attached to trees, stakes, fences, or other objects advertising matter not applicable to the premises where located shall not be permitted. Exceptions: Political signs as noted in Section 706.5.13. shall require a permit from the Police Department and are subject to State Law.

706.5.4 Illumination shall be installed in a manner so as not to create an unsafe condition for vehicular traffic or become a nuisance to abutting property owners. No flashing, moving, scrolling, or animated signs shall be allowed. Text and/or graphics that change more than once a day will be considered a flashing sign. The Neighborhood Business District is limited to illumination of signs until ten (10) o'clock P.M.

706.5.5 The limitation as to the number of signs does not apply to traffic or directional signals or signs which are necessary for safety and direction.

706.5.6 No signs shall be erected so as to obstruct any doors, windows, or fire escapes on a building.

706.5.7 At the boundary line of the Town of Windham, and within a Town right-of-way, a sign not exceeding five (5) square feet in area indicating the meeting of any Windham civic organization or directions to religious, educational, or other similar places may be erected only after the granting of a special permit by the Board of Selectmen.

706.5.8 In any district, one unlighted temporary sign offering premises for sale or lease for each property, tenant space or unit in one ownership or association shall be permitted provided it shall not exceed twelve (12) square feet in area, and it shall be on the property advertised.

706.5.9 In any district, one unlighted temporary sign identifying an architect, engineer or contractor, erected during the period such person is performing work on the premises on which sign is erected, shall be permitted; such sign shall not exceed the height and area limitations of the free standing sign of a NB District and shall be removed upon completion of work. The maximum amount of time shall be twelve (12) months unless a special exception is granted by the Zoning Board of Adjustment.

706.5.10 No sign affixed to a transportation vehicle either independently propelled or towable which is parked on a location for the purpose of advertising shall be allowed except where allowed by other sections of this ordinance

706.5.11 No permanent sign shall be affixed to any object within the Town right-of-way except as provided in Section 706.5.7. of the Town of Windham Zoning Ordinance and Land Use Regulations.

706.5.12 All political signs shall be governed by existing State Statute or
Section 700:10

as amended.

706.5.13 All signs shall not interfere with the Clear Sight Triangle; shall not be positioned so as to obstruct or be a hazard to traffic on a road, or to traffic entering or leaving the premises; and shall not create dangerous conditions with respect to pedestrians or vehicular traffic. No signs shall be erected so as to obstruct any doors, windows, or fire escapes of a building.

706.5.14 In Business Commercial A and B, Gateway Commercial, Limited Industrial, Neighborhood Business, Professional Business and Technology, and Village Center District; one unlighted on-premise temporary sign shall be displayed at a time, provided:

1. The temporary sign shall comply with the area, height, and setback requirements for a freestanding sign for the district in which it is located;
2. The temporary sign shall be securely anchored at a stationary location; non-motorized and non-moving; and shall not be lit or illuminated in any way;
3. Such sign shall not be displayed for more than 30 days in any calendar year;
4. Each temporary sign shall require a temporary sign permit, issued by the Code Enforcement Administrator;
5. The nature of allowed temporary signs shall be event related; and
6. One (1) sign per tenant per year.

No temporary signs shall be installed on any type of complex, except where defined elsewhere in this document, with two (2) or more tenant spaces or divisions. In case of a Unit, the temporary sign shall not be allowed if there exists a sign as described in Section 706.4.5 where changeable copy or print has been employed.

706.5.15 For all externally illuminated signs, down-lit signs are encouraged.

706.5.16 Hours of illumination shall coincide with the hours of operation of the business unless otherwise permitted by the Planning Board.

706.5.17 Existing non-conforming signs shall be removed or brought into compliance prior to granting of any site plan, subdivision approval, or change of use.

706.5.18 Electronic reader boards and electronic changeable copy signs are prohibited.

706.6 - Sign Specifications By District

	Res. A	Res. B	Res. C	Rural	Comm.	GTW	Lim. Ind.	PBT	NB	VCD
<hr/>										
Minimum Setbacks (ft)										
front yard	10	10	10	10	10	5	10	10	10	5
side yard	30	30	30	50	50	10	50	50	50	5
<hr/>										
Maximum Heights (ft)										
From Grade										
freestanding sign	6	6	6	6	12	8	12	12	10	5

freestanding sign (complex)	6	6	6	6	12	12	12	12	10	5
wall sign	1F ^A	1F ^A	1F ^A	1F ^A	15	15	15	15	15	1F
Maximum Sign Area (ft²)*										
freestanding sign (structure)	3 ^A	3 ^A	3 ^A	3 ^A	60 ^C	20	20	20	20	8
freestanding sign (complex)	20 ^B	20 ^B	20 ^B	20 ^B	60 ^C	60	60	60	20	16
wall sign	3 ^A	3 ^A	3 ^A	3 ^A	100 ^D	75 ^D	75 ^D	75 ^D	50 ^D	16
Changeable Copy (ft²)										
	NP	NP	NP	NP	20 ^E	NP	NP	NP	NP	16 ^F

Legend:

1F = 1st Floor
 2F = 2nd Floor
 NP = Not permitted
 SPR = Subject to Site Plan Review

Footnotes:

*: Per street frontage.
 A: Either 1 ground sign or 1 wall sign per housing structure.
 B: Maximum per entry location; may be split between one sign on each side of the street with a 50% increase in the total for this situation.
 C: Up to 33% of the base sign area may be added to this for changeable copy.
 D: Up to that amount of the total square footage contained on the face of the building or tenant space, for whichever purpose the sign serves, or 10%, whichever is less.
 E: Not to exceed 33% of the total sign area; applicable only to a freestanding sign, in addition to the maximum sign area.
 F: Not to exceed 50% of the total sign area; applicable only to a freestanding sign.
 G: No artificial grading of the landscape is allowed for the primary purpose of enhancing the sign's height.

Zoning District Abbreviations:

Res.A = Residence A	Lim.Ind.= Limited Industrial
Res.B = Residence B	PBT = Professional, Business and Technology
Res.C = Residence C	NB = Neighborhood Business
Rural = Rural	VCD = Village Center District
Comm. = Commercial A, B, and C	
GTW = Gateway	

707. Earth Removal:

707.1 The removal of earth, including soil, loam, sand, gravel, clay, stone, quarried rock or other subsurface products, except water, from land in the Town of Windham, including new or extension of existing earth removal operations, may be permitted upon grant of a special exception by the Board of Adjustment as provided in Section 900.

707.2 Before granting any such special exception, the Board of Adjustment shall give due consideration to the location of the place from which it is proposed to remove soil, loam, sand, gravel, clay, stone, quarried rock or other subsurface products, to the general character of the neighborhood surrounding such location and to the effect of the proposed removal on such neighborhood, to the amount of noise, dust and vibration safety of the public on the public ways giving access to and in the immediate vicinity of such location.

707.3 As a part of and set forth in any such permit issued by the Building Inspector, the Board of Adjustment shall impose such reasonable restrictions and conditions on the exercise of the permit as they deem to be in the public interest including but not limited to the following:

707.3.1 The duration of time during which the permit may be exercised.

707.3.2 The extent, depth, and contour of the area of removal.

707.3.3 The grade of the slope of the banks of the area of removal.

707.3.4 The proximity of such removal to any public way.

707.3.5 Bond or escrow agreement shall be required in an amount sufficient to provide recovering the area of removal with one of the following:

707.3.5.1 An area where loam has been removed shall be regraded with a minimum of two (2) inches of loam, seeded or hay-mulched.

707.3.5.2 Reforested.

707.3.5.3 Hay-mulched.

707.3.6 No excavation within the Wetlands and Watershed Protection District.

707.4 This Ordinance shall not apply to the removal of soil, loam, sand, gravel, clay, stone, quarried rock or other subsurface products when incidental to and reasonably required in connection with the construction on the premises of any building for which a permit has been issued by the Building Inspector and any subdivision approved by the Windham Planning Board for building or bonding of the roads.

708. Motorized recreational vehicles or recreational campers., Residential: In any district, except as noted in Section 603.2. of this Ordinance, no person shall use or occupy a trailer or motorized recreational vehicles or recreational campers for more than thirty (30) days. Residential use of a trailer or motorized recreational vehicles or recreational campers for a period in excess of thirty days, but less than one year, shall require a Special Exception from the Board of Adjustment, which may be granted for circumstances in which the primary residence has been destroyed or has become uninhabitable.

709. Motorized recreational vehicles or recreational campers., Non-residential: A single trailer, motorized recreational vehicles or recreational campers, or unregistered recreational vehicle, owned by a resident, but not used, may be kept on the premises of said residence provided that:

709.1 Such trailer or motorized recreational vehicles or recreational campers remains mobile.

709.2 It may not occupy any front or side yards.

709.3 It may not be located within fifteen (15) feet of either the side lot line or the rear lot line.

709.4 It creates no nuisance or risk of damage to health and/or property.

710. Fences: No fences in Residence A, B, C, and Rural Districts shall be constructed over three feet (3') in height for fences on the front lot line. Fences on side lot lines may be six feet (6') in height except that portion that is sixty feet (60') from the front lot line which shall be no more than three feet (3') in height. Fences on the rear lot line may be six feet (6') in height. In the case of lots located between public or private roads and the shore of a lake or pond, both the road and the shore will be considered front lot lines relative

to fence construction only. Fences, hedges, and trees in all districts shall not be installed and/or planted so as to obstruct view at intersection of public ways between the height of three feet (3') to eight feet (8') above the traveled way.

711. Mink Farms and Piggeries: Mink farms and piggeries shall be prohibited in all districts.

712. Governmental Installations: Town of Windham governmental installations shall be a permitted use in all districts of the Town subject to site plan review by the Planning Board as provided in Windham Site Plan Regulations.

713. Dwellings: No dwelling shall be built so that any portion of said dwelling shall be below the seasonal high-water table as determined by tests at the location, unless it can be shown that adequate drainage will be provided. Footings and other construction that are solely for the support of said dwelling are exempt from the above regulations.

714. Noise: All noise shall be muffled so as not to be objectionable due to intermittence, beat frequency or shrillness, and as measured at any property line of the lot shall not exceed the following intensity in relation to sound frequency:

Maximum Sound Level, above Zero

<u>Frequency, cycles</u>	<u>decibels Permitted*</u>
0 to 74	74
75 to 149	59
150 to 299	52
300 to 599	46
600 to 1199	42
1200 to 2399	39
2400 to 4799	36
4800 to ----	33

*According to the following formula: Sound Pressure Level in Decibels equals $10 \log P_1/P_2$ where P_2 equals 0.0002 dynes/cm

714.1 Such sound levels shall be measured with a sound level meter and octave band analyzer calibrated by a commercial calibration laboratory whose working standard is from the National Institute of Standards and Technology

714.2 Noise-making devices which are maintained and are utilized strictly to serve as warning devices are excluded from these regulations.

714.3 These noise standards will apply to the Industrial and Business Districts.

715. Impact Fees:

715.1 Authority: These regulations are authorized by New Hampshire RSA 674:21, V, and other pertinent state law, as an innovative land use control. Under this authority, new development in the Town of Windham may be assessed impact fees in proportion to its demand on the public capital facilities of the Town and the School District.

715.2 Purpose: The following regulations shall govern the assessment of impact fees for public capital facilities to accommodate the demands of new development on these facilities. These provisions are intended to:

715.2.1 Assist in the implementation of the Master Plan and Capital Improvements Program;

715.2.2 Ensure that adequate public capital facilities are available to serve the needs of new development;

715.2.3 Assess an equitable share of the cost of public capital facilities to new development in proportion to its demand on those facilities.

715.3 Definitions:

715.3.1 Assessed property means any land or buildings comprising new development that is subject to an impact fee under this Article.

715.3.2 Assessment with respect to an impact fee means a notification issued to an assessed property by the Town of Windham by its Planning Board, or its Code Enforcement Administrator, stating the amount of an impact fee due and the conditions or schedule for its collection.

715.3.3 Collection with respect to an impact fee means the actual delivery of payment of the fee to the Town of Windham on behalf of an assessed property.

715.3.4 Impact fee means a fee or assessment imposed upon development, including subdivision, building construction or other land use change, in order to help meet the needs occasioned by the development for the construction or improvement of capital facilities owned or operated by the municipality, including and limited to water treatment and distribution facilities; wastewater treatment and disposal facilities; sanitary sewers; storm water, drainage and flood control facilities; public road systems and rights-of-way; municipal office facilities; public school facilities; the municipality's proportional share of capital facilities of a cooperative or regional school district of which the municipality is a member; public safety facilities; solid waste collection, transfer, recycling, processing and disposal facilities; public libraries; and public recreation facilities, not including public open space.

715.3.5 New development means an activity that results in:

701. 715.3.5.1 The creation of a new dwelling unit or units or in the habitable portion of a residential building; or

715.3.5.2 The conversion of an existing use, or additions thereto, which would result in a net increase in the number of dwelling units; or

715.3.5.3 Construction resulting in a new non-residential building or a net increase in the floor area of any non-residential building; or

715.3.5.4 The conversion of an existing use to another use if such change would result in a net increase in the demand on public capital facilities that are the subject of impact fee assessment; however,

715.3.5.5 New development shall not include the replacement of an existing manufactured housing unit or the reconstruction of a structure that has been destroyed by fire or natural disaster where there is no change in size, density, or type of use that would increase the demand on capital facilities for which impact fees are assessed.

715.3.6 Off-site improvements means those improvements that are necessitated by a development but which are located outside the boundaries of the property that is subject to a subdivision plat or site plan approval by the Planning Board. Such off-site improvements shall be limited to any necessary highway, drainage, and sewer and water upgrades pertinent to that development.

715.3.7 Public open space means a parcel of land essentially unimproved and available to the public only for passive recreational use or natural resource conservation. Town parks which do not include "public recreation facilities" constitute public open space within the meaning of this Article.

715.3.8 Public recreation facilities means the land and facilities owned or operated by the Town of Windham, other than public open space, which are designed for the conduct of recreational sports, or other active leisure uses that include use of equipment, structures, or other improvements to the land to provide active indoor or outdoor public recreation programs or activities. Public recreation facilities may include improvements that occur within public open space parcels to provide active recreation components such as walking, hiking, or skiing trails.

715.3.9 School District means the Windham School District.

715.4 Authority to Assess Impact Fees: The Planning Board is hereby authorized to assess impact fees to new development in a manner consistent with the standards herein set forth. The Planning Board shall have the authority to adopt and amend regulations to implement the provisions of this ordinance and to delegate the administrative functions of impact fee assessment, collection and disbursement.

715.5 Standards and Basis of Assessment:

715.5.1 The amount of any impact fee shall be a proportional share of public facility improvement costs which are reasonably related to the capital needs created by the development, and to the benefits accruing to the development from the capital improvements financed by the fee.

715.5.2 The Planning Board may prepare, adopt, or amend studies, reports, or cost allocation procedures that are consistent with the above standards, and which define a basis for impact fee assessment for public capital facilities, and the impact fee assessment schedules therefore. Updates to the fee may be based on factors including, but not limited to revisions in the Windham Capital Improvement Program, capital facility cost estimates, data from the U.S. Census, local school enrollment data, estimates of the number of housing units and non-residential building area in Windham, property tax assessment data, interest and discount rates, construction cost adjustment factors and other information pertaining to proportional demand for public services and related capital facilities.

715.5.3 No methodology, cost allocation procedure, or other basis of assessment, nor related impact fee schedules, or changes in the basis of assessment or the fee schedules, shall become effective until it shall have been the subject of a public hearing before the Planning Board.

715.5.4 In the case of new development to be created by conversion or modification of an existing use, the impact fee shall be based upon the net positive increase in the impact fee assessed for the new use as compared to the highest impact fee that was or would have been assessed to the existing use.

715.5.5 Upgrading of existing facilities and infrastructures, the need for which is not created by new development, shall not be paid for by impact fees.

715.6 Change in Assessment Schedules: The impact fee assessment schedules shall be reviewed annually by the Board of Selectmen and the Planning Board, along with the foundation documents that provide the basis for the assessment schedules. Such review may result in recommended adjustments in one or more of the fees based on the most recent data as they affect the variables in the fee calculations. Changes in the impact fee assessment schedules shall be effective only where the change in the basis of assessment or the fee schedule is adopted following a public hearing on the proposed change.

701.1 715.7 Assessment and Collection of Impact Fees:

715.7.1 Where subdivision or site plan approval is required for new development, impact fee assessment shall take place at the time of Planning Board approval of a subdivision plat or site plan.

715.7.2 When no Planning Board approval is required, or has been made prior to the adoption or amendment of the impact fee ordinance, impact fees shall be assessed prior to, or as a condition for, the issuance of a building permit.

715.7.3 No building permit for new development requiring payment of an impact fee shall be issued until the amount of the impact fee assessment has been determined by the Code Enforcement Administrator.

715.7.4 Collection of the Impact fee shall be required on or before the time a certificate of occupancy is issued. If no certificate of occupancy is required, impact fees shall be collected at the time when the development is ready for its intended use.

715.7.5 The Planning Board and the Town of Windham may establish an alternate, mutually acceptable schedule of payment of impact fees applicable to an assessed property. If an alternate schedule of payment is established, the Planning Board may require the applicant to post security, in the form of a cash bond, letter of credit, or performance bond so as to guaranty future payment of assessed impact fees.

715.8. Waivers: The Planning Board may grant full or partial waivers of impact fees to an assessed property, subject to its finding that the proposed development meets one or more of the applicable conditions set forth below:

715.8.1 A full or partial waiver of public school impact fees may be granted for those residential units that are lawfully restricted to exclusive occupancy by persons age 55 or older within a development that is maintained in compliance with the provisions of RSA 354-A: 15, Housing For Older Persons. The Planning Board may waive school impact fee assessments on such age-restricted units where it finds that the property will be bound by lawful deeded restrictions on occupancy for a period of at least 20 years. The Planning Board may grant such a waiver upon receipt of satisfactory evidence that the proposed development will not generate public school enrollment while encumbered by appropriate age restrictive covenants.

715.8.2 The Planning Board may agree to waive all or part of an impact fee assessment and accept in lieu of a cash payment, a proposed contribution of real property or facility improvements of equivalent value and utility to the public. Prior to acting on a request for a waiver of impact fees under this provision that involves a contribution of real property or the construction of capital facilities, the Planning Board shall submit a copy of the waiver request to the Board of Selectmen for its review and consent prior to its acceptance of the proposed contribution. The value of contributions or improvements shall be credited only toward facilities of like kind, and may not

be credited to other categories of impact fee assessment. Full or partial waivers may not be based on the value of exactions for on-site or off-site improvements required by the Planning Board as a result of subdivision or site plan review, and which would be required of the developer regardless of the impact fee assessments authorized by this Ordinance.

715.9. Appeals Under This Article:

715.9.1 A party aggrieved by a decision made by the Code Enforcement Administrator relating to administrative decisions in the assessment or collection of impact fees authorized by this Section may appeal such decision to the Planning Board.

715.9.2 A party aggrieved by a decision of the Planning Board under this Article may appeal such decision to the Rockingham County Superior Court as provided by RSA 677:15, as amended.

715.10. Administration of Impact Fees:

715.10.1 All funds collected shall be properly identified by purpose and promptly transferred for deposit in a Capital Facilities Impact Fee Account. This account shall be considered as a special revenue fund account. Under no circumstances will impact fee revenues or interest accrue to the General Fund.

715.10.2 The Town Treasurer shall have custody of all fee accounts, and shall pay out the same only upon written orders of the Board of Selectmen. Funds withdrawn from the Capital Impact Fee Account, shall be used solely for the purposes for which they were collected.

715.10.3 Funds withdrawn from each Capital Facilities Impact Fee Account shall be used solely for the purpose of funding, planning, designing, constructing, expanding, or equipping the public capital facilities in the facility category for which the impact fee was assessed under this ordinance.

715.10.4 Impact fees may be used to pay debt service on bonds or similar debt instruments where such expenditures were related to developing capacity for education of Windham public school students or for Town public capital facilities that are the subject of an impact fee assessment.

715.10.5 The Board of Selectmen shall order the release of school impact fee funds to the School District, upon its request, upon demonstration by the district of encumbered expenditures eligible for reimbursement by impacts fee. School impact fees may be used to reimburse the School District for the value of public school capacity already constructed in anticipation of growth, or school capacity to be developed in the future

715.10.6 The Town Treasurer shall record all fees paid by date of payment and the person making payment, the tax map and lot reference number of each assessed property under this Article for a period of at least six (6) years. At the end of each fiscal year, the Town Treasurer shall make a report to the Board of Selectmen, the Planning Board, and the School District giving a detailed account of all capital facilities impact fee transactions during the year.

715.11. Refund of Fees Paid:

715.11.1 The owner of property for which an impact fee has been paid may apply to the Board of Selectmen for a refund of that fee, plus accrued interest, six (6) years from the date of the collection of that fee.

715.11.2 A refund to the property owner will be due only if the Windham School District or the Town of Windham has failed to encumber the governmental share of the capital improvement costs required to provide related facility capacity improvements to be funded in part by impact fees.

715.11.3 The Board of Selectmen shall annually provide each assessed property that is due a refund of an impact fee a written notice of the amount due, including any accrued interest.

715.12. Other Authority Retained: This ordinance shall not be deemed to affect other authority of the Windham Planning Board over subdivisions or site plans, or rules and regulations pertaining to the Town's water and sewer systems including, but not limited to:

715.12.1 The authority of the Planning Board to declare a development to be premature or scattered in accordance with the regulations of the Board and in accordance with RSA 674:36, II(a); or

715.12.2 The authority of the Planning Board to require the payment of exactions for off-site improvements for highway, drainage, sewer and water upgrades necessitated by the development, in accordance with the provisions of RSA 674:21, V (j); or

715.12.3 Other authority of the Town of Windham to assess other capital investment fees or system development charges under the authority of other statutes, Town ordinances, or through the Site Plan Review and Subdivision Regulations of the Windham Planning Board.

716. Vernal Pool Protection:

716.1 Purpose: The purpose of this section is to protect water quality, flood storage capacity, and open space, as well as to provide essential breeding habitat for amphibians and invertebrates.

716.2 Definitions:

Vernal Pool: A vernal pool is a contained basin depression of at least 500 square feet lacking a permanent above ground outlet. In the Northeast, it fills with water with the rising water table of fall and winter or with the meltwater and runoff of winter and spring snow and rain. Many vernal pools in the Northeast are covered with ice in the winter months. They contain water for a few months in the spring and early summer. By late summer, a vernal pool is generally (but not always) dry. A vernal pool, because of its periodic drying, does not support breeding populations of fish. Many organisms have evolved to use a temporary wetland which will dry but where they are not eaten by fish. These organisms are the "obligate" vernal pool species, so called because they must use a vernal pool for various parts of their life cycle. If the obligate species are using a body of water, then that water is a vernal pool. In New England, the easily recognizable obligate species are the fairy shrimp, the mole salamanders, and the wood frog.

716.3 Vernal pools shall have a minimum protective buffer of 25 feet from the edge of the pool. There shall be no cutting of vegetation or surface alteration within this area or within the vernal pool itself.

717. Cemetery Setback Requirements:

717.1 Purpose: Under RSA 289:3 (III) the State of New Hampshire has established certain statutory setbacks from burial sites, burial grounds and

cemeteries in the absence of local zoning regulations. This section is intended to serve as said local regulations.

717.2 Definitions: The terms "cemetery", "burial site", and "burial ground" shall all have the definitions, which are provided in RSA 289:1.

717.3 Structure Setback: No building or structure shall be constructed within 25 feet of a known burial site or within 25 feet of the boundaries of an established burial ground or cemetery. Underlying zoning may require a greater setback for structures, in which case the greater setback will apply.

717.4 Access Way and Utilities: No Driveways and utility services (either above ground or buried) may be placed within 25 feet of a known burial site or 25 feet of the boundaries of an established burial ground or cemetery.

717.5 Special Exception: Where the foregoing restrictions present practical difficulties to the use and enjoyment of adjoining properties, the Zoning Board of Adjustment may grant special exceptions from these provisions provided that:

- i) The proposed use must have approval of both the Board of Selectmen and Cemetery Trustees.
- ii) Such proposal does not impair the integrity of the cemetery walls, facilities, drainage, or other physical attributes.
- iii) The proposed use does not diminish the general solemnity and solitude of the cemetery setting. In this regard, the Board may require appropriate buffering or screening from such proposed use.
- iv) The proposed use does not pose a public safety hazard to the cemetery or patrons thereof.
- v) There are no practical alternatives to the proposed use.

718. Historic Demolition Delay Ordinance

718.1 This ordinance is adopted as an Innovative Land Use Control under the provisions of RSA 674:21 and shall be annexed to and become a part of the Windham Zoning Ordinance.

718.2 Except as otherwise provided herein, the following definitions apply:

718.2.1 Qualified Structure - A building which is (or was) a habitable residential or commercial structure, or a detached outbuilding, barn, garage, or ancillary structure in excess of 400 square feet and which

a) was constructed prior to 1940, or

b) appears on the Historic Resource Lists (if any).

718.2.2 Commission - The duly established Heritage Commission of the Town of Windham.

718.2.3 Historic Resource Lists - A list prepared by the Commission pursuant to RSA 674:44-b (I) (a) of the cultural resources of the Town of Windham.

718.2.4 Raze - To demolish or remove a structure.

718.2.5 Substantially Renovate - To do work to renovate, rehabilitate or modify a structure such that its exterior appearance or architectural features are substantially replaced.

718.2.6 Architectural Features - Those items on the exterior of a structure which give character to its appearance, including, but not limited to, doors, windows, shutters, exterior light fixtures, trim and moldings, exterior siding material, roofing material, chimneys, chimney caps, cupolas, weathervanes, etc.

718.2.7 Town - Town of Windham, New Hampshire.

718.2.8 Display Sign - A sign or poster prepared by and at the expense of the Commission, which:

- a) Shall be no greater than 36 inches x 36 inches in size
- b) Printed on durable material suitable for exterior display
- c) Shall state thereon, that the owner of the property has applied for a permit to raze or substantially renovate a qualified structure located at the property, and that a copy of the application has been forwarded to the Commission for comment

718.3 The general purpose of this ordinance is to provide the Town and the Commission the opportunity to consult with any owner who wishes to raze or substantially renovate any qualified structure within the Town in an effort to preserve and/or document the character and cultural resources of the Town of Windham.

718.4 Except as otherwise provided herein, no permit to raze or substantially renovate a qualified structure may be issued for at least thirty (30) days following the submittal of an application for same to the Windham Building Department.

718.5 Upon the filing of an application to raze or substantially renovate a qualified structure:

718.5.1 The applicant for said permit shall be given a Display Sign which must be posted on the property within seventy two (72) hours and shall remain posted until the permit is issued. The sign shall be posted on the property within ten (10) feet of the front property line of the frontage giving access to the property and in a fashion such that it is visible from the adjoining roadway.

718.5.2 The Building Department shall, within seventy two (72) hours of receipt of such application, forward a copy to the Commission by first class mail, interoffice delivery or other means intended to reach the Commission. The Building Department shall also notify the Commission Chairman by telephone or electronic mail (as indicated by the preference of the then-serving Chair) of the filing of the application.

718.6 Upon receipt of a copy of an application to raze or substantially renovate a qualified structure, the Commission shall determine if it wishes to confer/consult with the applicant concerning the request. The Commission may take either of the following actions:

718.6.1 It may notify the Building Department and applicant that it has no interest in the request, in which case, the permit may be issued once other required waiting periods have expired.

718.6.2 The Commission may schedule a public meeting to discuss the request with the applicant, and any other interested persons.

718.7 If the Commission elects to schedule a public meeting on the pending request:

718.7.1 It shall schedule the same no later than the 28th day after the permit application has been filed.

718.7.2 It shall send notice by first class mail to the owner, indicating to the owner that they must appear at said meeting in person or by a legal representative. Such notice shall be sent at least five (5) days before the meeting date.

718.7.3 It shall post required notice of said meeting indicating the intention to discuss the pending application(s).

718.7.4 The meeting may be rescheduled or continued at the request of the landowner, but must occur within forty five (45) days of the application filing.

718.8 The purpose of the public meeting is to discuss with the applicant the alternatives to demolition and/or possibilities to preserve certain architectural features of the qualified structure. If the applicant does not wish to retain any particular architectural feature, the applicant will be encouraged to consider donating such item(s) or offering them for sale to the general public.

718.9 No actual permit to raze or substantially renovate a qualified structure shall be issued until:

718.9.1 Thirty (30) days have elapsed since the filing of the application unless the Building Department has received a notification of "no interest" by the Commission. See, 6 (i) above;

718.9.2 The applicant files an affidavit, on a form prepared by the Town, which affirms that the required posting (See, Section 5(i)) was completed; and

718.9.3 The applicant (or their representative) has met with the Commission to discuss the application; or

718.9.4 That forty five (45) days have elapsed since the filing, and the Commission has not scheduled or conducted a meeting on the request.

718.10 Nothing contained in this ordinance shall be construed as giving the Commission or the Town any authority to prevent the issuance of the requested permits or require any action by an applicant other than to appear before and discuss the application with the Commission.

718.11 The provisions of this ordinance may be waived when either the Building Inspector (or his designee) or the Fire Chief (or his designee) shall have determined that the demolition of any structure is immediately required to protect public safety or to remove a hazardous condition.

SECTION 800 - ADMINISTRATION

The provisions of this ordinance and any amendments thereto shall be administered and enforced by the Code Enforcement Administrator who shall be appointed by the Selectmen.

SECTION 900 - BOARD OF ADJUSTMENT

901. Establishment: - A Board of Adjustment shall be established in accordance with chapter 673 of the Revised Statutes Annotated, and shall exercise all duties and functions granted to it and the Building Code Board of Appeals under the provisions of Title LXIV of the Revised Statutes Annotated. The following administrative provisions shall govern the Board of Adjustment:

901.1 The Board shall adopt Rules of Procedure in accordance with RSA 676:1, which shall not be inconsistent with the laws of the State of New Hampshire or any other provision contained therein.

901.2 The Rules of Procedure of the Board shall provide for the election of a Chairman, Vice Chairman, and Secretary at the Board's first meeting following the annual election of members.

901.3 The Secretary of the Board of Adjustment shall keep minutes of the Board's proceedings, showing the vote of each member upon every question, or if absent or failing to vote, indicating that fact. The Secretary shall keep records of the Board's examinations and official actions, all of which shall be public record.

902. Meetings: - Meetings of the Board shall be held as provided in the Rules of Procedure, in conformance with the time requirements of State law.

903. Decision: - The concurring vote of three (3) members of the Board of Adjustment shall be necessary to reverse any order, requirement, decision, or determination of the administrative officer, or to decide in favor of the applicant on any matter upon which it is required to pass, in accordance with the provisions of this Ordinance.

904. Appeals: - Appeals to the Board of Adjustment may be taken by any person aggrieved, or by an officer, department board or bureau of the municipality affected by any decision of the administrative officer. Such appeals shall be governed by the following deadlines:

904.1 Appeals of any decision to issue a permit shall be made within five (5) days of the issuance of same, provided the application for such a permit has been posted at least five (5) days in advance of issuance as provided in local rules of Procedure.

904.2 Appeals of decisions of the Building Inspector or Code Enforcement Administrator of official findings or determinations of violations of the building code or local Land Use Regulations shall be filed for appeal within thirty (30) days of written notice sent by such officials' finding or declaring a notice of violation.

Such appeals shall be on forms as promulgated by the Board, by filing with the Board and the officer from whom an appeal is taken.

905. Hearing on Appeals: - Upon receipt of an Appeal, the Board of Adjustment shall schedule a public hearing, giving the notice, and within the time as required under

RSA 676:7. The Board's Rules of Procedure shall address the conduct of the public hearing.

906. Duration of Approvals: - Any variance or special exception granted by the Board of Adjustment shall be terminated one (1) year from its issuance by the Board of Adjustment and recorded with the Town clerk unless the variance or special exception granted has been exercised by the recipient. However, this Section shall not preclude the earlier invalidity of a variance or special exception if prior to its exercise by the recipient the circumstances in existence at the time of its issuance have altered appreciably.

SECTION 1000 - AMENDMENT

This Ordinance may from time to time be changed by amendment, addition or repeal by a town meeting in the manner provided by Chapter 31:63a of the New Hampshire Revised Statutes Annotated, 1955, and any amendments thereto.

SECTION 1100 - VALIDITY

Where this Ordinance imposes a greater restriction upon the use, height and the area of structures or the use of premises than is imposed by other ordinances, the provisions of this Ordinance shall control. The invalidity of any section or provision of this Ordinance shall not invalidate any other section or provision thereof.

1200. Structure Conversion:

1200.1 Any change from seasonal to full time year-round shall be a permitted use provided that:

1200.1.1 Minimum standards of the Windham Building Code are met.

1200.1.2 Minimum standards of the Windham Health Regulations are met.

1200.1.3 The lots otherwise conform to dimensional and other requirements in Section 700.

1200.1.4 The provisions of the following subsections 1200.2., 1200.3 and 1200.4 are complied with.

1200.2 Definitions:

Sewage Disposal System: means any private sewage disposal or treatment system, other than a municipally owned and operated system.

Developed Waterfront Property: means any parcel of land as defined in RSA 4:40-a and upon which stands a structure suitable for either seasonal or year-round human occupancy.

1200.3 Sewage Disposal System: Prior to occupying any existing structure on a full-time basis, which would increase the load on a sewage disposal system, the owner of such structure shall submit an application for approval of the sewage disposal system to the Building Department. Application for approval shall include one of the following:

1200.3.1 Evidence that the existing sewage disposal system meet the requirements of the W.S.P.C.D. for the intended usage or the Town's minimum standard for use or occupancy, whichever is more stringent.

1200.4 For the Purpose of Conversions of Seasonal Use to Year Round Use: The following site assessment study shall be required:

1200.4.1 Shall include the name, address, and telephone number of the owner's agent and the location and a brief description of the property, including the tax map reference and lot number.

1200.4.2 Shall include the lot size, slope, loading (based on the number of existing or proposed bedrooms in the structure), water source, soil type, and estimated seasonal high water table information to be determined by on site investigation (Test Pits). The licensed designer shall write his assessment of the site for the current use and proposed use of the system, based upon the criteria and information in this subparagraph.

1200.4.3 Shall include information about this present sewage disposal system, if available. If the installed system was approved by the Town a copy of the approval form, approval number and plan shall be attached to the site assessment study. An assessment study indicating that the site fails to meet any of the criteria established under this section shall prohibit the conversion of the property.

1200.4.4 The site assessment form submitted to the State of N.H.W.S.P.C.D. shall be attached to the Town site assessment report and shall also indicate the State approval or disapproval.

SECTION 1300 VIOLATIONS

Any person who violates or fails to comply with any of the provisions of this ordinance shall be liable for the fines and penalties as provided for in RSA 676:17. Additionally, the Town may pursue the injunctive relief as provided for in RSA 676:15 together with reimbursement of costs and attorney's fees all as provided for under law. References to statutes above is assumed to include successor enactment's by the legislature on the same subjects.

SECTION 1400 - SEPARABILITY

If any section, subsection, phrase, sentence or portion of this Ordinance is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate district and independent provision and such holding shall not affect the validity of the remaining portions thereof.

SECTION 1500 - ENFORCEMENT

Pursuant to Section 800, the Code Enforcement Administrator, as designated by the Selectmen (and/or an employee of his/her department designated by him/her) shall be responsible for enforcement of this ordinance and shall hold authority granted under state law to institute and prosecute proceedings, to enforce, enjoin or bring proceedings as a result of violation of any provisions hereunder.

SECTION 1600 - EFFECTIVE DATE

This Ordinance shall take effect upon adoption.

APPENDIX A-1

TABLE OF REQUIREMENTS (9, 12)

District	Min. Lot Frontage in feet (2)	Min. Front Yard in feet (3)	Min. Side Yard in feet (4)	Min. Rear Yard in feet	Max. % Bldg. Coverage of lot	Min Floor Area Per Dwelling in sq. feet
Single Family Dwellings						
Rural District	175	50	30 (11)	30 (11)	20%	1,000
Res. A District	175	50	30	30	20%	1,000
Res. B Multi-Family District (5)	175 plus 30' for each additional dwelling	50	30 plus 10' for each additional dwelling (7)	30 plus 10' for each additional dwelling (8)	20%	750
Res. C District	175	50	30	30	20%	600
Neighborhood Business District	175	50	30	30	30%	0
Gateway Commercial District	50	0 (13)	0 (14)	0 (14)	70%	0
Business Commercial A and B Districts	175	75	20 (6)	30 (6)	30%	0
Limited Industrial District	175	50	20 (6)	30 (6)	30%	0
Village Center District	50	0 (10)	0	0	100%	0
Professional Business, and Technology District	175	50	20 (6)	30 (6)	30%	0

Minimum Lot Area See Note #1

NOTES FOR TABLE

1. Wetlands of a lot shall not be computed as part of the lot area. Minimum land area requirements for all districts shall be computed based on soil types as required in Table of Requirements Minimum Lot Area by soil type. Whenever a lot contains soils having two or more types of soil which pose different degrees of problems for on-site waste disposal systems, the minimum land area shall be computed by reference to the percentage of the total usable lot taken up by each soil type.

Whenever a lot contains multiple soils with two or three different degrees of

limitation for on-site waste disposal systems, the leach field shall, whenever possible, be located on the soils which pose the least degree of limitation for the system. When computing minimum land areas under this Section, wetlands, flood plains, exposed ledge, easements except slope easements, and slopes greater than 25% shall not be counted.

When it has been determined that a lot has two or more slope types, the same method shall be used to determine the lot area as is used when the lot has two or more soil types. On lots with slope types C or greater, driveway profiles of the first 100 feet shall be provided. (See Windham Subdivision Regulations as amended.)

2.Said measurement shall be taken at a point fifty (50) feet from the nearest front lot line.

2.1. Private roads may be allowed to satisfy frontage requirements in Residence B District. Minimum standards for such private roads shall be Town Specifications, except that the width may vary according to traffic needs.

3.Providing that any residential front yard need only be the average of the depths of the front yards of the abutting lots; the front yards of the abutting vacant lots shall be considered to have the minimum permitted.

4.Except that in the case of a lot having frontage on two (2) streets, the front yard requirements apply to the side of the structure on street frontage as well as to the front.

4.1. In Residence B District, there shall be forty (40) feet minimum distance between multifamily dwellings.

5.For each multifamily dwelling, 5,000 square feet of land area shall be added to the lot area for each bedroom in excess of two (2). For example: Each multifamily dwelling containing six two-bedroom dwelling units would be required to have a minimum of 100,000 square feet (i.e., 50,000 square feet plus 5,000 square feet for each bedroom in excess of two (2), or 50,000 square feet for a total minimum land area of 100,00 square feet. This example is based on soils which pose slight problems for on-site waste disposal systems.

5.1. For a multifamily dwelling containing less than five (5) dwelling units, the area of land required per bedroom in excess of two (2) may be reduced as follows: For multifamily dwellings containing four (4) dwelling units, 4,000 square feet per bedroom; for multifamily dwellings containing three (3) dwelling units, 3,000 square feet per bedroom; for multifamily dwellings containing two (2) dwelling units, 2,000 square feet per bedroom. A multifamily dwelling containing in excess of three (3) bedrooms per dwelling unit shall require 5,000 square feet per bedroom in excess of two (2).

6.Fifty (50) feet where abuts Residential District.

7.The minimum side yard for each multifamily dwelling shall be thirty (30) feet plus ten (10) feet for each additional dwelling unit in excess of one (1). (See Table of Requirements Minimum Side Yard.)

8.The minimum rear yard for each multifamily dwelling shall be thirty (30) feet plus ten (10) feet for each additional dwelling unit in excess of one (1).

9. Non-residential uses of land, which abut a residential district or a pre-existing residentially used lot, shall provide a fifty (50) foot wide buffer between the use and the district. Said buffer shall include natural or added planting or evergreens which will screen non-residential uses from residential areas during winter months.

10. Except 50-foot front yard setback on Route 111 Right of Way.

11. For uses other than residential in the Rural District, there shall be one-hundred (100) feet where abuts a residentially developed area.

12. The minimum shoreland setback in non-W.W.P.D. areas for non-accessory buildings shall be fifty (50) feet from the reference line (Reference Line: For natural fresh water bodies = natural mean high water level; For artificially impounded fresh water bodies = water line at full pond).

13. A minimum setback from Range Road (Route 111A) and Route 111 shall be twenty-feet (20').

14. A minimum twenty-foot (20') landscaped buffer shall be required on any lot line where the abutting parcel is not situated within the Gateway Commercial District.

MINIMUM LOT AREA BY SOIL TYPE

NOTE: The following may not be a complete list of soil types in Windham. Contact the Soil Conservation Service or the Rockingham County Conservation District for assistance. The minimum lot area shall be 50,000 square feet and shall contain 30,000 square feet of contiguous area, except as defined in the Village Center District and the Open Space Residential Overlay District. The 30,000 square feet of contiguous area shall not include wetlands, the Wetland Watershed Protection District, or drainage easements. The area within the 30,000 square feet shall accommodate a minimum rectangular area of 10,000 square feet with a minimum dimension of 100 feet. The Planning Board may approve areas meeting the required area even though they do not meet the rectangular requirement. The principal structure shall be located entirely in the 10,000 square foot area. The Planning Board can allow the 10,000 square foot area to be located outside the 30,000 square foot area when the Board determines that the purpose of this ordinance would be better served with the required area in another location.

Soil Type	Lot Size	Soil Type	Lot Size	Soil Type	Lot Size
111BH	50,000	111CH	55,000	111DH	75,000
111EH	NA	112BH	95,000	112CH	100,000
112DH	120,000	112EH	NA	114*	NA
11XBH	100,000	11XCH	125,000	11XDH	160,000
11XEH	NA	121BH	50,000	121CH	55,000
121DH	75,000	121EH	NA	122BH	95,000
112CH	100,000	122DH	120,000	122EH	NA
124*H	NA	12XBH	100,000	12XCH	125,000

12XDH	160,000	12XEH	NA	161BH	60,000
161CH	70,000	161DH	90,000	161EH	NA
164*H	NA	166*H	NA	16XBH	110,000
16XCH	140,000	16XDH	160,000	16XEH	NA
211BH	50,000	211CH	55,000	211DH	75,000
211EH	NA	21XCH	125,000	212BH	95,000
212CH	100,000	212DH	120,000	212EH	NA
213BH	60,000	213CH	95,000	213DH	125,000
213EH	NA	214*H	NA	21XBH	100,000
21XDH	160,000	21XEH	NA	221BH	50,000
221CH	55,000	221DH	75,000	221EH	NA
222BH	95,000	222CH	100,000	222DH	120,000
222EH	NA	223BH	60,000	223CH	95,000
223DH	125,000	223EH	NA	224*H	NA
22XBH	100,000	22XCH	125,000	22XDH	160,000
22XEH	NA	231BH	50,000	231CH	55,000
231DH	75,000	231EH	NA	233BH	60,000
233CH	95,000	233DH	125,000	233EH	NA
234*H	NA	23XBH	100,000	23XCH	125,000
23DXH	160,000	23XEH	NA	241BH	60,000
241CH	95,000	241DH	125,000	241EH	NA
243BH	60,000	243CH	95,000	243DH	125,000
244*H	NA	24XBH	110,000	24XCH	160,000
24XDH	180,000	24XEH	NA	251BH	110,000
251CH	160,000	251DH	160,000	251EH	NA
253BH	110,000	253CH	160,000	253DH	160,000
253EH	NA	254*H	NA	25XBH	160,000
25XCH	190,000	25XDH	240,000	25XEH	NA
261BH	60,000	261CH	70,000	261DH	90,000
261EH	NA	263BH	75,000	263CH	105,000
263DH	140,000	263EH	NA	264*H	NA
266*H	NA	26XBH	110,000	26XCH	140,000
26XDH	160,000	26XEH	NA	275*H	NA
311BH	75,000	311CH	110,000	311DH	150,000
311EH	NA	312BH	120,000	312CH	155,000
312DH	160,000	312EH	NA	313BH	75,000
313CH	110,000	313DH	150,000	313EH	NA
314*H	NA	31XBH	125,000	31XCH	150,000
31XDH	160,000	31XEH	NA	321BH	60,000
321CH	95,000	321DH	125,000	321EH	NA
322BH	105,000	322CH	125,000	322DH	160,000
322EH	NA	323BH	75,000	323CH	110,000
323DH	150,000	323EH	NA	324*H	NA
32XBH	125,000	32XCH	150,000	32XDH	160,000
32XEH	NA	331BH	95,000	331CH	125,000
331DH	155,000	331EH	NA	333BH	95,000
333CH	125,000	333DH	155,000	333EH	NA
33XBH	145,000	33XCH	160,000	33XDH	205,000
33XEH	NA	334*H	NA	341BH	95,000
341CH	125,000	341DH	155,000	341EH	NA

343BH	95,000	343CH	125,000	343DH	155,000
343EH	NA	344*H	NA	34XBH	145,000
34XCH	160,000	34XDH	205,000	34XEH	NA
351BH	110,000	351CH	160,000	351DH	160,000
351EH	NA	353BH	110,000	353CH	160,000
353DH	160,000	353EH	NA	354*H	NA
35XBH	160,000	35XCH	190,000	35XDH	240,000
35XEH	NA	361BH	90,000	361CH	125,000
361DH	160,000	361EH	NA	363BH	90,000
363CH	125,000	363DH	160,000	363EH	NA
364*H	NA	366*H	NA	36XBH	140,000
36XCH	160,000	36XDH	170,000	36XEH	NA
375*H	NA				
412BH	160,000	411BH	110,000	411CH	160,000
413CH	160,000	412CH	190,000	413BH	110,000
41XCH	180,000	414*H	NA	41XBH	160,000
422BH	160,000	421BH	95,000	421CH	145,000
423CH	160,000	422CH	165,000	423BH	110,000
42XCH	180,000	424*H	NA	42XBH	160,000
433BH	145,000	431BH	145,000	431CH	160,000
43XBH	175,000	433CH	160,000	434*H	NA
441CH	160,000	43XCH	235,000	441BH	145,000
444*H	NA	443BH	145,000	443CH	160,000
451BH	160,000	44XBH	175,000	44XCH	235,000
453CH	205,000	251CH	205,000	453BH	160,000
45XCH	285,000	454*H	NA	45XBH	195,000
463BH	130,000	461BH	130,000	461CH	160,000
466*H	NA	463CH	160,000	464*H	NA
		46XBH	165,000	46XCH	195,000

APPENDIX TO SECTION 601.2.1

1. Bogs are underlain by peat or muck deposits of significant depths and are characterized by a distinct group of trees and plants which are adapted to the bog's highly acidic conditions. The water in a bog is practically devoid of oxygen and nutrients. Bogs usually develop in undrained glacial depressions.

Typical of the bog are: Sphagnum Moss (Sphagnum); Cotton-grass Eriophorum spp.); Bog-rosemary (Andromeda Glaucophylla); Leather-leaf (Chamaedaphne Calyculata); Bog-laurel (Kalmia polifolia); Pitcher-plant (Sarracenia purpurea); Sundews (Drosera spp.); Cranberries (Vaccinium oxycoccos and V. macrocarpon); Sweet Gale (Myrica gale); Bogbean or Buckbean (Menyanthes trifoliata); Bladderworts (Utricularia spp.); Black Spruce (Picea mariana); Larch or Tamarack (Larix laricina).

2. Marshes are treeless wetlands dominated by soft-stemmed herbaceous plants. The surface of the marsh is covered with water though seasonal fluctuations in water depth are expected. Marshes range from the wet meadows variety to deep marshes which can be covered with several feet of water.

Typical plants of the marsh are: Bur-reeds (Sparganiaceae); Sedges, including

bulrushes, cotton-grasses and wool-grasses (Cyperaceae); Rushes (Juncaceae); Cat-tails (Typhaceae); Arums (Araceae); Smart weeds (Polygonum spp); Hydrophyllous grasses (Gramineae); Frog's bits (Hydrocharitaceae); Pickerelweeds (Pontederia spp.); Water-lilies (Nymphaeaceae); Duckweeds (Lemnaceae).

3. Swamps are dominated by trees and shrubs. The water table is at or near the ground surface for a significant part of the year.

Typical plants of swamps are: Red maple (Acer rubrum); Black ash (Fraxinus nigra); Willows (Salix spp.); Alders (Alnus spp.); Black Gum (Nyssa sylvatica); Common Elder (Sambucus canadensis); Winterberry (Ilex verticillata); Marsh-rose (Rosa palustris); Arrow-wood (Viburnum recognitum); Wood reedgrasses (Cinna spp.); Skunk-cabbage (Symplocarpus foetidus); Marsh-marigold (Caltha palustris); Button-bush (Cephalanthus occidentalis); White hellebore (Veratrum viride).

I hereby certify this ordinance is accurate and was made
effective at the March 11, 2008 Town vote.

Neelima Gogumalla _____

Walter Kolodziej _____

Phillip LoChiatto _____

Rick Okerman _____

Ruth-Ellen Post _____

Nancy Prendergast _____

Pam Skinner _____

ORDINANCE:

REGULATING NOISE

Section I: Purpose

The purpose of this Ordinance is to regulate the making, creation, or maintenance of excessive, unnecessary or unusually loud noises that, in their time, place and manner adversely affect and are a detriment to public health, comfort, safety and welfare of the residents of the Town of Windham.

Section II: Authority

This Ordinance has been enacted pursuant to the statutory authority granted to the Town of Windham by RSA 31:19, I (n)

Section III: Definitions

For the purpose of this Ordinance, the following words and phrases when used herein shall be construed as follows:

- A) *Town* - The Town of Windham, New Hampshire.
- B) *Board* - Board of Selectmen of the Town of Windham.
- C) *Construction* - Any site preparation, assembly, erection, substantial repair, alteration or similar action, but excluding demolition.
- D) *Continuous Sound* - Any sound that exists, essentially without interruption, for a period of 10 minutes or more.
- E) *Demolition* - Dismantling or intentional removal of structures, utilities, public or private right of way surfaces or similar property.
- F) *Impulse Noise* - Any noise of short duration, usually less than one second, and of high intensity, with an abrupt onset and rapid decay.
- G) *Noise Disturbance* - Any sound, whether a continuous sound or an impulse noise which is loud or unreasonable and which disturbs a reasonable person with normal sensitivities.
- H) *Person* - Any individual, partnership, company, corporation, association, firm, organization, governmental agency, administration or department, or any other group of individuals, or any officer or employee thereof.
- I) *Power Tool* - Any device powered mechanically, by electricity, by compressed air, by gasoline, by diesel fuel or by any other fuel, which is intended to be used or is actually used for but shall not be limited to, the performance of such functions as cutting, blowing, nailing, stapling, sawing, vacuuming or drilling.
- J) *Residential Property* - Any real property developed and used for human habitation and which contains living facilities, including provisions for sleeping, eating, cooking and sanitation, unless such premises are actually occupied and used primarily for purposes other than human habitation.
- K) *Undue hardship* - A situation or circumstance in which it is unreasonable to require the applicant to conduct the regulated activity during the hours permitted under the ordinance.

Section IV: Regulation Applicability

- A) It shall be unlawful for any person to carry on the following activities if such activities create a noise disturbance that generates a complaint:

- 1) Between 10:00 p.m. and 7:00 a.m. (Monday through Saturday) and 10:00 p.m. and 9:00 a.m. (Sunday) the loading, unloading, opening, closing, or other handling of boxes, crates, containers, building materials, trashcans, dumpsters, or similar objects.
- 2) Between 10:00 p.m. and 7:00 a.m. (Monday through Saturday) and 10:00 p.m. and 9:00 a.m. (Sunday) the operation or use of heavy construction vehicles and equipment involved in construction, demolition, property maintenance or similar activity, including, but not limited to, bulldozers, graders, dump trucks, backhoes, earthmoving equipment, front end loaders and log skidders.
- 3) Between 10:00 p.m. and 7:00 a.m. (Monday through Saturday) and 10:00 p.m. and 9:00 a.m. (Sunday) the operation or use of tools, power tools, or construction equipment to include, but not limited to: cement mixers, rock crushers, hammers, staple or nail guns, power tools whether involved in construction, demolition, repair, maintenance or similar activity.

Section V: Exemptions

- A) The following uses and activities shall be exempt from the foregoing noise/time restrictions:
- 1) Noise of safety signals, warning devices, and emergency pressure relief valves.
 - 2) Noise resulting from any public safety vehicle when responding to an emergency call or acting in time of emergency, or any public safety personnel when otherwise performing their duties.
 - 3) Noise resulting from emergency maintenance work or work that cannot be performed during the day due to mitigating factors such as traffic volume or facility use, as performed by the Town, the School District, the State, public utility companies, or a private property owner in the event of a legitimate emergency.
 - 4) Noise resulting from snow removal operations performed by the Town, the State, and other types of private or commercial snow removal operations.
 - 5) Any other noise resulting from activities of a temporary duration permitted by the law and for which a license or permit therefore has been granted by the Town.

Section VI: Waiver

- A) An application for a waiver the provisions of this ordinance on the basis of undue hardship may be made to the Board of Selectmen. Any such waiver granted by the Board of Selectmen shall set forth all conditions pertaining to the specified noise, and a reasonable time limit for its abatement.

Section VII:

- A) These requirements shall not apply where such matters are governed by State Law.

Section VIII: Penalties

- A) Any person who violates the provisions of this ordinance or any landowner who permits violation of the provisions of this ordinance shall be guilty of a violation under RSA 625:9 (V)(a) and may be penalized by a fine of not more than \$300 for the first offense, \$500 for the second offense, and \$1000 for the third and any subsequent violations thereafter.

Section IX: Validity

- A) If any section, clause, provision or phrase of this ordinance shall be held to be invalid or unconstitutional, such holding shall not affect, impair, or invalidate any other section, clause, or provision, portion or phrase of this ordinance.

Section X: Enforcement

- A) These regulations are enforceable by the Windham Police Department.

Section XI: Effective date/amendments

- A) This ordinance shall become effective March 30, 2008 and may from time to time be amended by the Board of Selectmen at a regularly scheduled meeting subsequent to a public hearing duly posted fourteen (14) days prior.

Adopted at Official Ballot Vote: March 11, 2008

TRANSMISSION LOSS DATA

The Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and then presented graphically. Octave-band Transmission Loss values are calculated as described in Section 12.4 of ASTM E90-97.

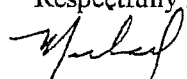
United Steel Structures – USSI-12N52

1/3 Octave Band Center Freq. (Hz)	Transmission Loss (dB)	Uncertainty (+/- dB)	Notes	Octave Band TL (dB)	STC Deficiencies
50	19		[d] [g]		
63	20		[g]	20	
80	19	2.8	[g]		
100	21	1.9			
125	28	2.5		25	8
160	32	1.5			7
200	37	0.7			5
250	43	1.0		40	2
315	49	0.6			
400	52	0.6			
500	54	0.5		53	
630	53	0.4			
800	54	0.4			
1000	53	0.4		55	2
1250	58	0.3	[c]		
1600	63	0.2	[a] [c]		
2000	62	0.3	[c]	62	
2500	60	0.3	[c]		
3150	62	0.2	[c]		
4000	61	0.2		60	
5000	58	0.3			
6300	60	0.4			
8000	63	0.5	[c]	62	
10000	64	0.8	[a] [c]		
STC	52				
OITC	35				

Note: Reverberation times are calculated based on the first 15 dB of decay including an initial 5 dB drop. Acoustic Systems maintains in its files quality assurance documentation indicating the result magnitude and uncertainty are consistent with calculation methods of Section 11.4.1 of ASTM E 90-97. [a]: Receive room SPL corrected for background noise; [b]: Receive room SPL too close to ambient. Correction of 2 dB applied and result represents lower bound for TL in this band; [c]: Correction made for flanking transmission; [d]: Transmission Loss of specimen too close to facility limit. No facility correction applied and result represents lower bound for TL in this band; [e]: Transmission Loss of specimen too close to filler wall. Result represents lower bound for TL in this band; [f]: Insufficient precision to meet requirements of Section A.2.2 of ASTM E 90-97; [g] An insufficient number of statistically independent samples are available in the band to determine precision.

During the test, environmental conditions in the Receive Room were 22.3C with 73.6% relative humidity. Conditions in the Source Room were 23C with 74% relative humidity. The precision values $[\pm]$ tabulated above represent 95% probability that the true mean value lies within the stated range.

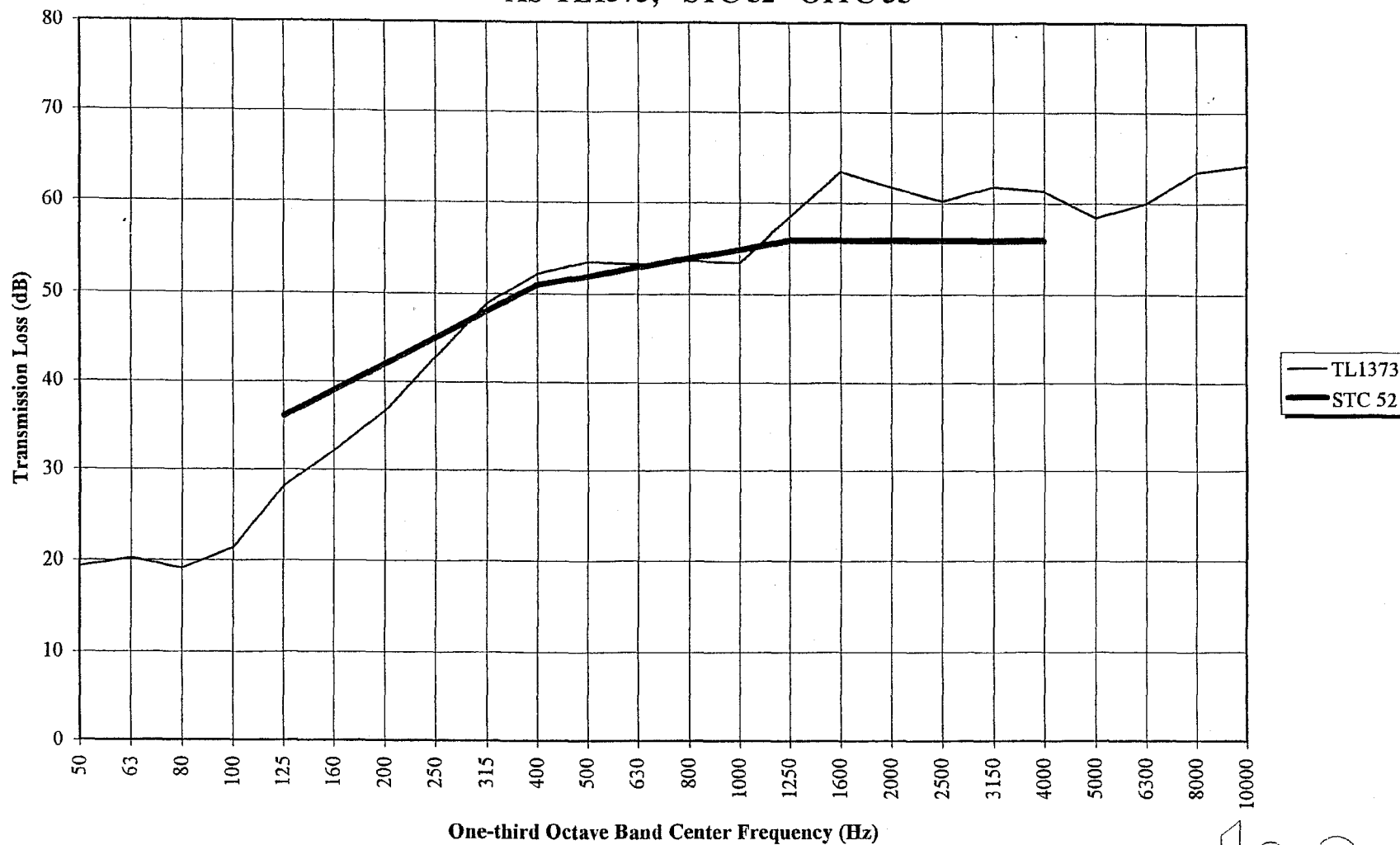
Respectfully Submitted,



Michael C. Black
Laboratory Technical Director

Certified copies of this Report carry a **Raised Seal** on every page.

United Steel Structures USSI-12N52
AS-TL1373; STC 52 OITC 35



ACOUSTIC
SYSTEMS

NVLAQ

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**ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
AS-TL1373**



ERNEST BUTLER, M.D., Chairman
DAVID MICHALEK, President

Subject: Sound Transmission Loss Test

Date: July 30, 1999

Contents: Transmission Loss Data, One-third Octave Bands
Transmission Loss Data, Octave Bands
Sound Transmission Class Rating
Outdoor / Indoor Transmission Class Rating

on

USSI-12N52

for

United Steel Structures

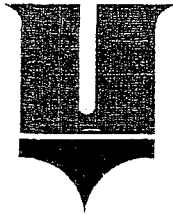
**ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY is
NVLAP-Accredited for this and other test procedures.**

National Institute of
Standards and Technology



National Voluntary Laboratory
Accreditation Program

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UNITED STEEL STRUCTURES

INCORPORATED

14925 MEMORIAL DRIVE • HOUSTON, TEXAS 77079
OFFICE (281) 496-1300 • www.ussi.com • FAX (281) 496-1314

El Paso Corporation
Fullbright Tower Building
1301 McKinney Street
Suite 3259
Houston, Texas 77010

November 3, 2008

Reference: United Steel Structures, Inc. – Project #: 08-3301
Tennessee Gas Pipeline Company/El Paso Corporation
Hillsborough County, New Hampshire
Concord Compression – Expansion Project
Station 270B1

Attention: Tom Fillip

Per the above referenced project and related specifications, listed below is the panel(s) and insulation system we are going to use on the Concord Station Compressor Building. Additionally, this particular described system is our "12N52" acoustical wall system that we will be utilizing for this application.

Building roof panels to be 24-ga. pre-painted "R" of 3' effective width coverage.

Building wall panels to be 24-ga. pre-painted "R" panels of 3' effective width coverage.

Building interior roof and wall liner panels to be 26-ga. manufacturers standard white pre-painted perforated (23%), corrugated type panels of 3' effective width coverage.

Building roof and walls to be insulated with PSK-VR faced - 6" thick x nominal .8# pcf fiberglass insulation (R-19).

Building roof and walls are to be insulated with 6" thick x nominal 8# pcf mineral wool.

Both building roof and walls to have fiber barrier installed as a vapor barrier.

Upon your review should there be any questions or further clarification(s) are required, please don't hesitate to contact me at any time.

UNITED STEEL STRUCTURES, INC.


Gary Cavey
Project Manager

Overhead Door Company Of Manchester

Div. of Maine Building Specialties Co.

10 Liberty Drive

Londonderry, NH 03053

Telephone: (603) 434-2911

Fax: (603) 434-4302

Other Offices:

Portland, ME

Portsmouth, NH

Augusta, ME

MNHS

The Genuine. The Original.



Proposal #: 1-2117

Q 4043

PROPOSAL SUBMITTED TO: United Steel Structures				Date 8/18/2008		Attention			
STREET 14925 Memorial Drive				Job Name TGP Station 270B1					
City Houston		State Texas		Zip Code 77079		Job Location Pelham, NH 03076			
Phone Number 1-281-496-1300		Fax Number 1-281-496-1314		Job Phone 1-281-496-1300					
ITEM #	QTY	SERIES	DOOR WIDTH	DOOR HEIGHT	OPENING WIDTH	OPENING HEIGHT	OPERATION	MOUNTING	JAMB TYPE
1	2	625	14' 0"	16' 0"	14' 0"	16' 0"	Chain hoist	Interior	Wood

FURNISH AND INSTALL:

The above sized 625 series rolling door(s) as manufactured by the Overhead Door Corporation. Door standard features to include the following: Curtain to consist of double interlocking slats with foamed-in-place insulation. Curtain will be provided with malleable iron endlocks on alternate slats. Windlocks will be used as required to meet design wind load, minimum 20 psf. Guides will be three structural steel angles with weatherstripping on exterior side. Brackets will be hot rolled steel plate to support the barrel, counterbalance and hood. Hood will include baffle. All non-galvanized, exposed, ferrous surfaces will receive one coat of rust inhibitive primer. Curtain to have baked enamel prime finish.

PROPOSAL TO INCLUDE THE FOLLOWING:

- SLATS, F-265 24 Gauge. - GUIDES, Cold Galvanized. - GUIDES, W/S 1 Side, Angle Guides. - OPERATION, Interior Chain (STD). - HOOD, Interior Baffle. - LOCK, Slide Bolt. - Windload, 15' Width, F-265 24/24 Slat, Design 20 PSF, - BOTTOM BAR, Cold Galvanized Double Angle. - Sloped hood option.

- All openings to be prepared by others to Overhead Door Company specifications.

Note: Price does not include reinforced metal rain and snow canopy (to be supplied by others).

TERMS AND CONDITIONS

Payment to be made as follows: As requested.

Prices subject to change if not accepted in 30 days.

BY OTHERS: Jamb, spring pads, all wiring to motors and control stations, unless otherwise stated above, are not included. Purchaser agrees that doors shall remain in Seller's possession until paid in full. In the event Purchaser breaches or defaults under the terms and provisions of this Agreement, the Purchaser shall be responsible for the costs of collection, including reasonable attorneys' fees. There shall be a 1 1/2% service charge per month for all payments due and owing after 30 days. (Agreements are contingent upon strikes, accidents, or delays beyond our control.) Authorization is given for credit inquiries as needed for this contract.

ACCEPTANCE: Terms, Price, and specifications on all pages of this proposal are hereby accepted and the work authorized.

Purchaser: _____

Signature

Title

Date of Acceptance

Sound Attenuator

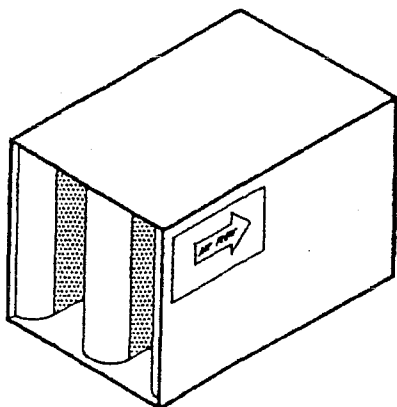
NO. 778-95

ENGINEERING DATA SHEET



Commercial Acoustics
5960 W. WASHINGTON STREET
PHOENIX, ARIZONA 85043
(602) 233-2322 FAX 233-2033

A DIVISION OF METAL FORM MANUFACTURING



MODEL HPA

RECTANGULAR

NOMENCLATURE EXAMPLE:

WIDTH	HEIGHT	LENGTH	MODEL
24	24	36	HPA

Commercial Acoustics sound attenuators are engineered to achieve a maximum insertion loss and a minimum pressure drop. Commercial Acoustics sound attenuators feature airfoil design for efficient aerodynamic performance, as well as superior acoustical materials and total galvanized steel construction, guaranteeing excellent reliability and performance.

MODEL NO.	OCTAVE BANDS	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	CENTER FREQUENCY (Hz)	63	125	250	500	1000	2000	4000	8000
	FACE VELOCITY FPM	DYNAMIC INSERTION LOSS IN DECIBELS							
3HPA	-2000	8	13	22	30	37	34	23	13
	-1000	6	12	16	31	37	32	27	14
	+1000	6	11	15	26	36	36	27	17
	+2000	6	10	16	26	33	34	29	18
5HPA	-2000	12	23	26	43	49	43	36	23
	-1000	12	20	23	42	48	45	38	21
	+1000	9	17	25	39	46	45	40	25
	+2000	8	15	21	38	44	45	40	27
7HPA	-2000	13	25	37	47	52	45	41	31
	-1000	12	24	36	47	52	49	43	31
	+1000	11	21	34	44	52	47	44	33
	+2000	9	16	35	46	48	49	46	34
10HPA	-2000	12	26	44	53	54	53	48	41
	-1000	12	25	43	53	56	52	50	42
	+1000	13	24	43	51	54	54	50	46
	+2000	13	17	42	51	54	52	50	47

THIS TABLE CONTAINS BOTH FORWARD (+) AND REVERSE (-) FLOW ACOUSTIC AND AERODYNAMIC RATINGS BASED ON COMPARATIVE TEST RESULTS MEASURED IN ACCORDANCE WITH ASTM E477. COPIES OF CERTAIN TEST REPORTS CAN BE FURNISHED UPON REQUEST.

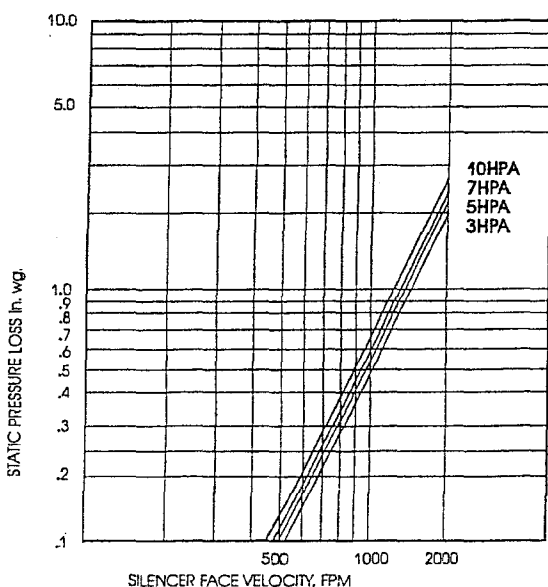
Sound Attenuator

RECTANGULAR MODEL HPA

ENGINEERING DATA

AIR FLOW RATING FOR THE 12 x 12 SIZE, SHADED, REPRESENTS BOTH CFM AND FACE VELOCITY IN FPM. USE THIS TO GET THE RATING FOR MULTIPLE MODULE SILENCERS.

MODEL	3HPA	0.06	0.09	0.16	0.21	0.26	0.29	0.39	0.51	0.59	0.74	0.99	1.24
	5HPA	0.06	0.10	0.16	0.23	0.27	0.32	0.43	0.56	0.67	0.84	1.09	1.37
	7HPA	0.07	0.12	0.17	0.25	0.31	0.37	0.47	0.61	0.73	0.91	1.19	1.51
	10HPA	0.08	0.14	0.21	0.28	0.35	0.41	0.55	0.67	0.81	0.99	1.37	1.71
SIZE W x H	FACE AREA	AIR FLOW IN CFM											
6 x 12	0.50	227	297	354	402	438	465	500	569	630	743	858	959
6 x 24	1.00	454	594	707	804	875	930	1000	1138	1260	1485	1715	1917
6 x 36	1.50	681	891	1061	1206	1313	1395	1500	1707	1890	2228	2573	2876
12 x 12	1.00	454	594	707	804	875	930	1000	1138	1260	1485	1715	1917
12 x 24	2.00	908	1188	1414	1608	1750	1860	2000	2276	2520	2970	3430	3834
12 x 36	3.00	1362	1782	2121	2412	2625	2790	3000	3414	3780	4455	5145	5751
18 x 12	1.50	681	891	1061	1206	1313	1395	1500	1707	1890	2228	2573	2876
18 x 18	2.25	1022	1337	1591	1809	1969	2093	2250	2561	2835	3341	3859	4313
18 x 30	3.75	1703	2228	2651	3015	3281	3488	3750	4268	4725	5569	6431	7189
18 x 36	4.50	2043	2673	3182	3618	3938	4185	4500	5121	5670	6683	7718	8627
18 x 48	6.00	2724	3564	4242	4824	5250	5580	6000	6828	7560	8910	10290	11502
24 x 24	4.00	1816	2376	2828	3216	3500	3720	4000	4552	5040	5940	6860	7668
24 x 36	6.00	2724	3564	4242	4824	5250	5580	6000	6828	7560	8910	10290	11502
24 x 48	8.00	3632	4752	5656	6432	7000	7440	8000	9104	10080	11880	13720	15336
30 x 24	5.00	2270	2970	3535	4020	4375	4650	5000	5690	6300	7425	8575	9585
30 x 36	7.50	3405	4455	5303	6030	6563	6975	7500	8535	9450	11138	12863	14378
30 x 48	10.00	4540	5940	7070	8040	8750	9300	10000	11380	12600	14850	17150	19170
36 x 36	9.00	4086	5346	6363	7236	7875	8370	9000	10242	11340	13365	15435	17253
36 x 42	10.50	4767	6237	7424	8442	9188	9765	10500	11949	13230	15593	18008	20129
36 x 48	12.00	5448	7128	8484	9648	10500	11160	12000	13656	15120	17820	20580	23004



Air flow ratings shown include static regain. Therefore if silencers are installed immediately before or after elbows, transitions, at the intake or discharge of the system, or without duct, allowance to compensate for such conditions must be included when calculating the operating pressure loss thru the silencer. Failure to make allowance for these conditions can add several velocity heads to the pressure loss of the system. All acoustic and aerodynamic performance obtained on 24" x 24" cross section production units.

SELF-GENERATED SOUND POWER RATINGS (PWL) dB re 10⁻¹² WATTS

OCTAVE BAND		1	2	3	4	5	6	7	8
Hz		63	125	250	500	1000	2000	4000	8000
MODEL	FACE VELOCITY								
3HPA	+2000	73	70	62	64	60	62	62	57
5HPA	+1000	54	48	50	48	45	48	43	33
7HPA	-1000	55	50	51	51	54	57	51	39
10HPA	-2000	67	61	62	67	60	63	67	65

SELF-GENERATED SOUND RATINGS/FACE AREA ADJUSTMENT FACTORS

FACE AREA	.50	1	2	4	8	10	32	64	128
PWL ADJUSTMENT FACTOR, dB	-9	-6	-3	0	+3	+6	+9	+12	+15